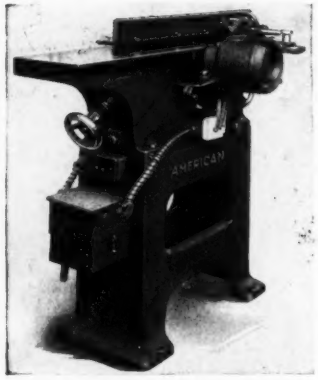
THE INDUSTRIAL-ARTS MAGAZINE

PROPERTY OF
ENGINEERING READING ROOM
SCHOOL OF
THE PENNSYLVANIA STATE COLLEGE

June 1926

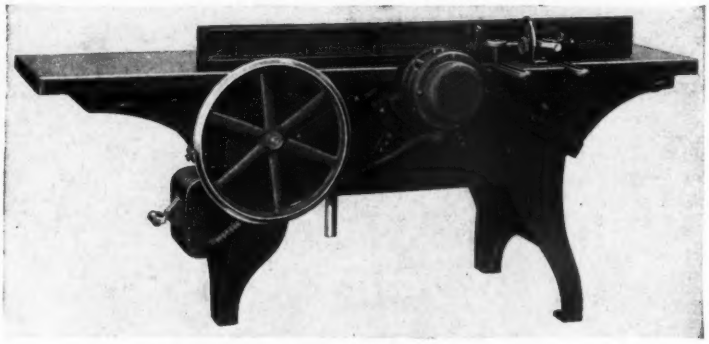
The
Bruce Publishing Company
Milwaukee, Wisconsin.



American No. 1 Bench Jointer

Knowledge Gained on American Machines will never Desert You

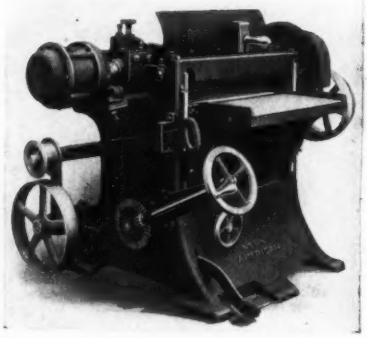
Training in Shop Practice should always be done on real shop machines.



American No. 1 Buzz Planer and Jointer

American Machines spring from the highest requirements of the industries. They are industrial machines.

"The tools of school are the tools of life"



American No. 1½ Single Surfacer

Yates-American Machine Co.

Educational Department

ROCHESTER, N. Y.

Stretch that Appropriation By BUYING RIGHT

HOW do you buy? Pick up a half-pint of this and a gallon of that as you need it? Or, just tell Jones' Paint Store to send up this assortment of Nameless Varnish and any kind of Enamel? And then wonder why the boys have trouble and where the money goes?

Why not use JOHNSON'S WOOD FINISHES at SCHOOL PRICES? Get the highest grade materials made, purchase them in quantities and save money.

Johnson quality is unsurpassed. You probably have used Johnson Wood Dye and Johnson's Wax for years. The entire Johnson line is the kind of reliable trouble-proof material that actually helps "teach". It includes:

VARNISHES FILLERS ENAMELS
UNDER-LAC WAXES UNDERCOATS
WOOD DYES (both OIL STAIN and SPIRIT STAIN)

Write for Johnson Catalog and School Prices Today!

Redecorating?

In addition to regular shop supplies, we make a complete line of Interior Finishes including Flat Wall Finish, etc. School boards planning on redecorating either now or during the next vacation can make material savings by buying Johnson Materials. Just check the third space on this coupon and let us send you all information.

S. C. JOHNSON & SON, Dept. I. A. 6 RracINE, WIS.
"The Wood Finishing Authorities"

☐ Please send specimen set of Johnson Job Sheets.
☐ Also include latest Johnson School Price List on shop materials.
☐ We are redecorating school buildings in the near future and are interested in saving money on decorating materials.

NAME .....
POSITION .....
SCHOOL .....
CITY & STATE .....

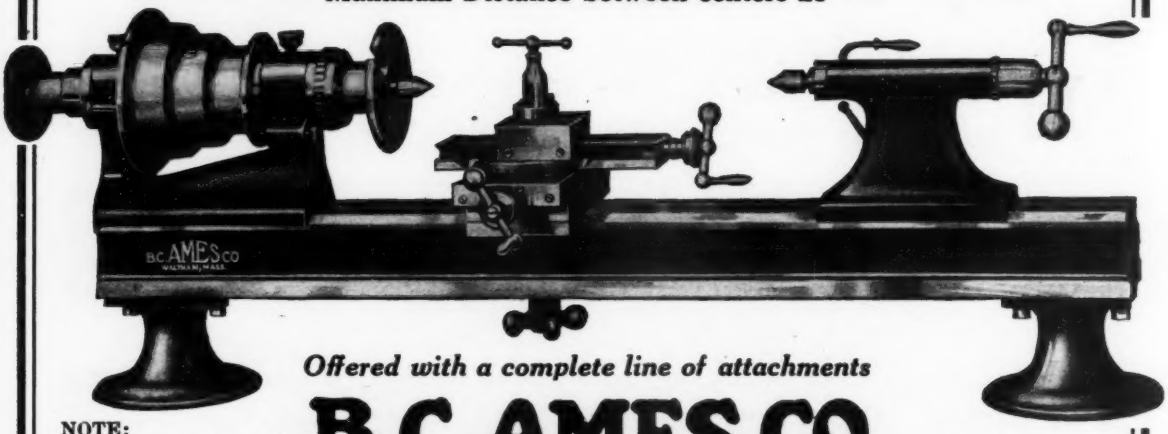
AMES BENCH LATHES

The ideal small precision lathe for every school shop—Practical and accurate

Used for Turning–Drilling–Milling–Thread Cutting–Grinding–Filing–Polishing

Length over Bed 36″ Swing over Bed 8⅜″

Maximum Distance between centers 21″



Offered with a complete line of attachments

NOTE:
"The Bench Lathe at Work"—a practical 32-page text book, will be supplied in quantity for class room use.

B.C. AMES CO.
Waltham, Mass.

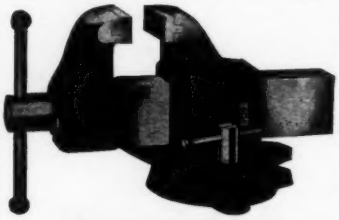
SEND FOR CATALOG

TEACH THEM ON VISES
They Will Eventually Use

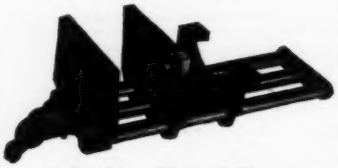
Columbian Vises on the Instructor's Bench give students an advantage when they leave school and take up their various trades.

When they go to work, they find familiar tools to work with — almost everywhere.

You can equip all departments of your school with Columbian Vises. There is a type and size for every purpose.



Columbian Malleable Iron Machinists' Vise.



Columbian Manual Training Vises.

Literature gladly sent to instructors on request.

The Columbian Hardware Company
Cleveland, Ohio

COLUMBIAN

Do you practise what you preach about tools?

No doubt you impress on the youthful carpenter and mechanic the value of fine tools. You tell him that it is true economy to use the best.

Are you giving him a practical demonstration of this by equipping him with Maydole Hammers? Their superior strength and durability mean that they're actually the most economical for you to use.

Ask your dealer or write us for Catalog 23H.

The David Maydole Hammer Co.
Norwich New York

Maydole Hammers

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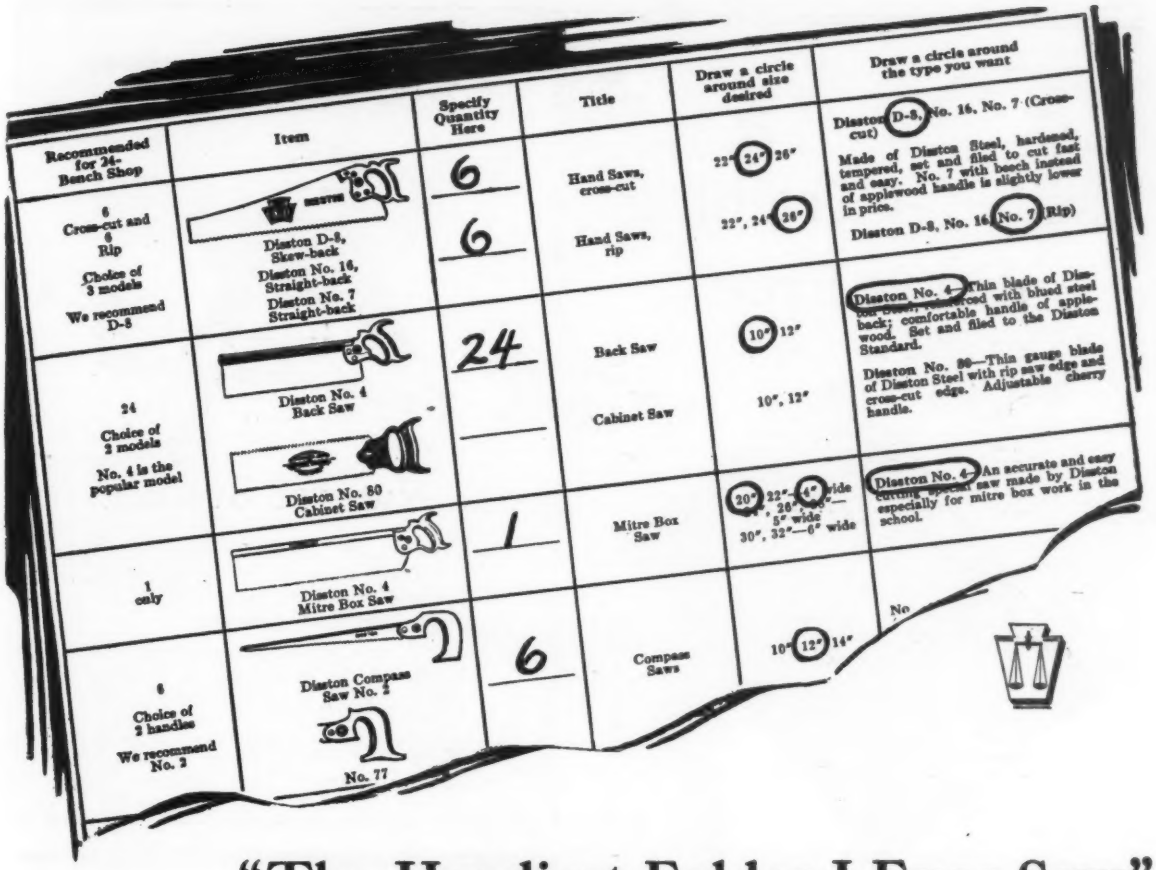

Recommended for 24-Bench Shop	Item	Specify Quantity Here	Title	Draw a circle around size desired	Draw a circle around the type you want
6 Cross-cut and 6 Rip. Choice of 3 models. We recommend D-8	Disston D-8, Skew-back; Disston No. 16, Straight-back; Disston No. 7 Straight-back	6	Hand Saws, cross-cut	22" 24" 26"	Disston D-8, No. 16, No. 7 (Cross-cut) Made of Disston Steel, hardened, tempered, set and filed to cut fast and easy. No. 7 with beech instead of applewood handle is slightly lower in price.
		6	Hand Saws, rip	22", 24" 26"	Disston D-8, No. 16, No. 7 (Rip)
24 Choice of 2 models. No. 4 is the popular model	Disston No. 4 Back Saw; Disston No. 80 Cabinet Saw	24	Back Saw	10" 12"	Disston No. 4—This blade of Disston Steel, reinforced with blued steel back; comfortable handle of applewood. Set and filed to the Disston Standard.
			Cabinet Saw	10", 12"	Disston No. 80—This gauge blade of Disston Steel with rip saw edge and cross-cut edge. Adjustable cherry handle.
1 only	Disston No. 4 Mitre Box Saw	1	Mitre Box Saw	20" 22"–4" wide 24", 26"–5" wide 30", 32"–6" wide	Disston No. 4—An accurate and easy cutting special saw made by Disston especially for mitre box work in the school.
6 Choice of 2 handles. We recommend No. 2	Disston Compass Saw No. 2; No. 77	6	Compass Saws	10" 12" 14"	No

"The Handiest Folder I Ever Saw"

So says one manual training school supervisor about the new Disston Specification Folder.

"Why," says he, "when any item occurs to me that I know we'll need next term, I get out this folder . . . fill in the number I'll want . . . . and put a circle around the size and model. (See illustration.)

"With a few pencil strokes I save making a lot of loose notes that I often lost; I have a compact record from which my typist can make up specification sheets—and I'm sure of getting the quality I specify, because there's a complete description of every tool there."

You, too, can save a lot of time and clerical labor with the Disston Specification Folder.

Look at the portion of this folder illustrated above. See how easy it is to specify hand saws and other special saws.

You can have this Folder free if you'll fill in and mail the coupon. You need it now.

The coupon brings it

HENRY DISSTON & SONS, Inc.
Philadelphia, U. S. A.
Send me without cost your Specification Folder.
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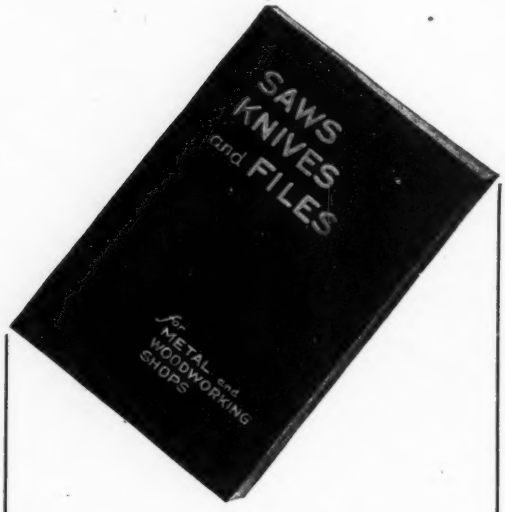
School .....
City .....
State .....

HENRY DISSTON & SONS, Inc.
Makers of "The Saw Most Carpenters Use"
Philadelphia, U. S. A.

DISSTON

Manual Training Book Free



Send For it Now

"Saws, Knives and Files" is the title of this most instructive book, published by the Simonds Saw and Steel Co. This is really an instruction book which deals with the use and care of Saws, Knives and Files, in the school shop. It is particularly useful to instructors and students of manual training.

Send for it now. It is free.

SIMONDS
Saw and Steel Co.
470 Main St.,
FITCHBURG, MASS.

LITTLE GIANT

Natural Stone

The cutting qualities of natural stone have never been surpassed and for certain classes of work never have been equalled.

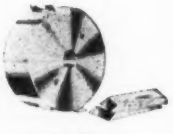
Certainly a strong recommendation for its use by students. Write for particulars.

THE CLEVELAND STONE CO.
Union Trust Building Cleveland, Ohio

Improve Your Shop Equipment

Huther Bros. Dado Head

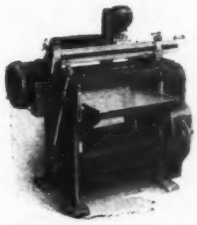
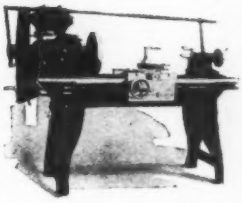
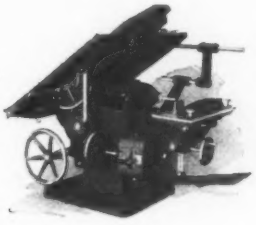
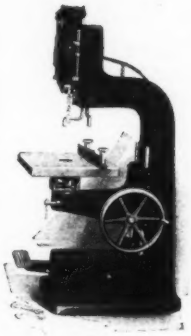
A Huther Brothers Dado Head will speed up and simplify your intricate cutting and grooving. It consists of two outside cutters and enough inside cutters to perform the required cut. The cutters can be used in pairs or in any combinations desired.

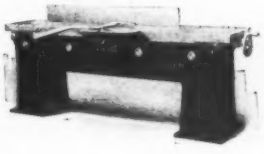
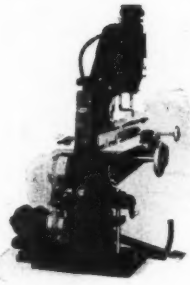
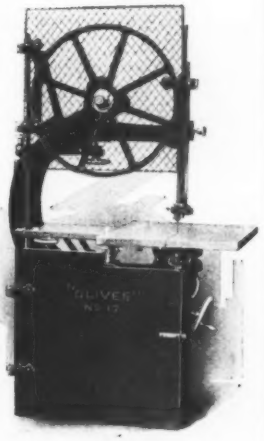
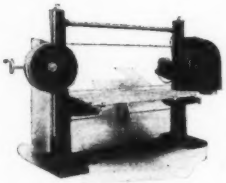
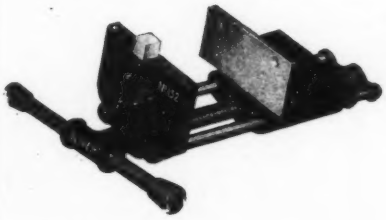

Huther Bros. Cutter Head

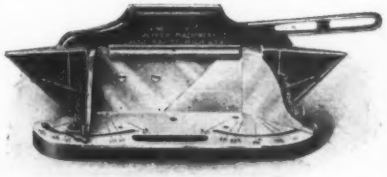
Huther Brothers Round Cutter Head is especially desirable for jointing and running light mouldings on saw mandrels. The knives are set with the use of a headless set screw and flanged side plates strengthen the head and keep knives from twisting while being set.

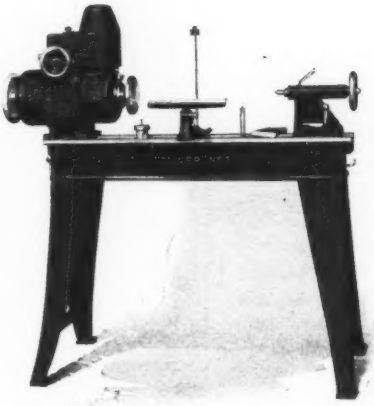
HUTHER BROTHERS SAW MANUFACTURING COMPANY
Rochester, N. Y.
Makers of Better Saws for More Than 50 Years

Write for catalog No. 46 illustrating and describing the entire Huther Line.





"Oliver" Success

in furnishing Woodworking Machinery for School Use is not luck. It is due to the satisfaction that "Oliver" Equipment gives. That satisfaction is not luck, either. It is the logical reward for the long and serious efforts of "Oliver" Engineers in working with the School Authorities and learning their needs and satisfying them.

May they work with you?

Oliver Machinery Co.
GRAND RAPIDS, MICH.

"Betcha! F' work'r tinkerin' It has 'em all beat"—

"I can remember when we packed seven tools around to do what that Starrett Combination Square does. An' then they didn't do it any better. Mebbe not so good. There's a marking gage, a rule, a square, a miter, a depth gage, height gage, level and plumb, all in that combination an' each of 'em a mighty good tool all by itself.

"I dunno's there's any tool I got—barrin' a hammer an' saw—that I use any oftener. I always take it down to camp with me an' it comes in mighty handy when I'm fixing things up. An' around the house—say, I wouldn't be without it. If you haven't one of 'em, go an' get one—quick. Most any hardware dealer will fix you up."

THE L. S. STARRETT CO.

World's Greatest Toolmakers
Manufacturers of Hacksaws Unexcelled
Steel Tapes - Standard for Accuracy

ATHOL, MASS.

No. 94

Ask your dealer to show you this Combination Square. Ask us for a free copy of the big Starrett Catalog No. 23-"CE."

9218

Starrett Tools

This NEW Glue Pot *SAVES*

Your Instructor's Time,
Wasted Glue,
Spoiled Work and
Heating Expense.

***The* WALLACE**
ELECTRIC GLUE POT *HEAT CONTROLLED*

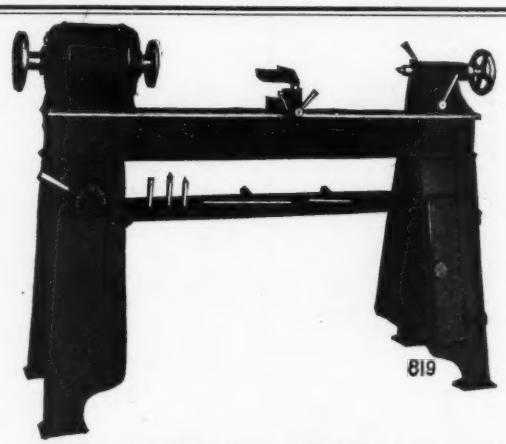
Sealed Water Bath—No slopping over or evaporation. Highly efficient control—keeps glue at proper temperature without attention.

Economical in operation—due to action of control.

Absolutely safe — no fire hazard.

J. D. WALLACE & CO.
140 S. California Ave.,
CHICAGO, ILLINOIS

Write for Catalog No. 403



Speed plus Safety

Here is a high-speed ball-bearing Lathe which proves that safety can go hand-in-hand with fast, accurate work. Everything possible is enclosed. Made with Motor Head-Stock as shown, or with Motor in the leg under Head-Stock.

This Lathe is capable of standing the severest service, yet turns out work that would delight the most painstaking craftsman. It is a quality product and this same factor makes "American" Saw Benches, Woodworkers, Sanders, Jointers and Band Saws preferred by competent instructors everywhere.

Write for free booklet.

AMERICAN
SAW MILL MACHINERY CO.

MAKERS OF WOODWORKING AND SAW MILL MACHINERY
74 MAIN ST., HACKETTSTOWN, N. J.

Give them good tools to learn with

Here's the third generation working with Millers Falls tools. Mechanics have liked them for fifty-odd years; a good workman prizes good tools for the good work they help him do.

The Millers Falls Spiral Ratchet Screw Driver has a service record of nearly three years. It was and is a success, a smooth-working, handsome, sturdy tool, Millers Falls quality in every respect.

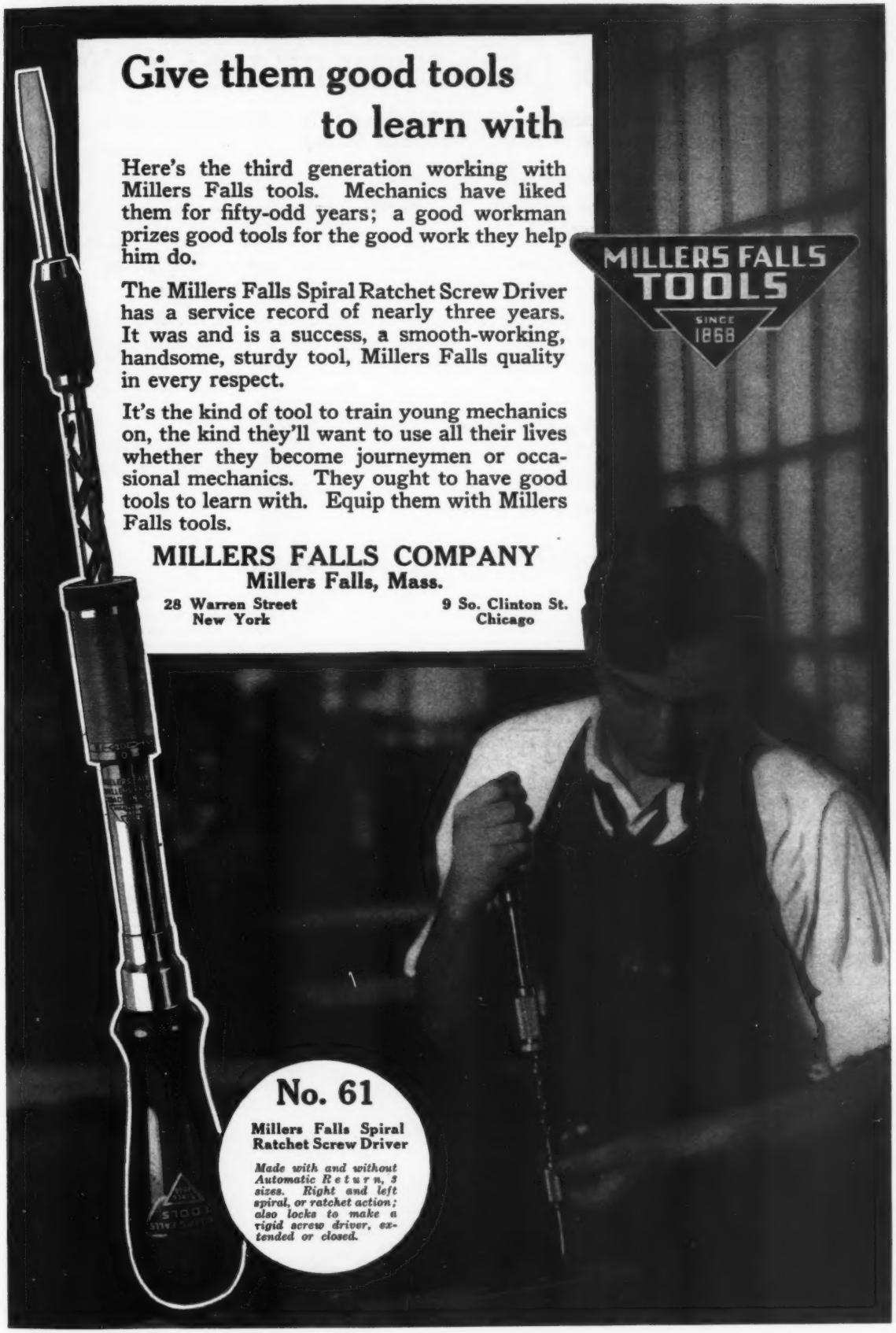
It's the kind of tool to train young mechanics on, the kind they'll want to use all their lives whether they become journeymen or occasional mechanics. They ought to have good tools to learn with. Equip them with Millers Falls tools.

MILLERS FALLS COMPANY
Millers Falls, Mass.

28 Warren Street
New York

9 So. Clinton St.
Chicago

MILLERS FALLS TOOLS
SINCE 1868



No. 61

Millers Falls Spiral Ratchet Screw Driver

Made with and without Automatic Return, 3 sizes. Right and left spiral, or ratchet action; also locks to make a rigid screw driver, extended or closed.

Little Giant Band Saw

1876-GOLDEN JUBILEE YEAR-1926

Good Reputation of 50 years growth is built into the Little Giant Line of Lathes and Band Saws;

50 years of conscientious effort;

50 years of growth of plant and of organization and ambition to excel;

All these are put into the Little Giant Lathes and Band Saws.

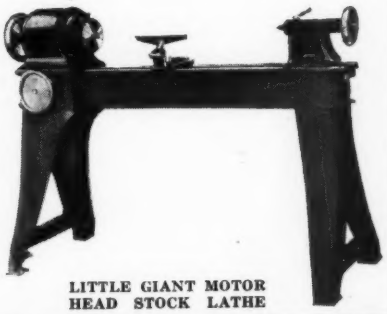
As a result we offer the Little Giant Line to the Schools of the United States, as perfect Shop Tools, as Tools in the forefront of Shop equipment.

To prove this we allow
30 DAYS FREE TRIAL

Send for our New Free Catalog.

Little Giant Company

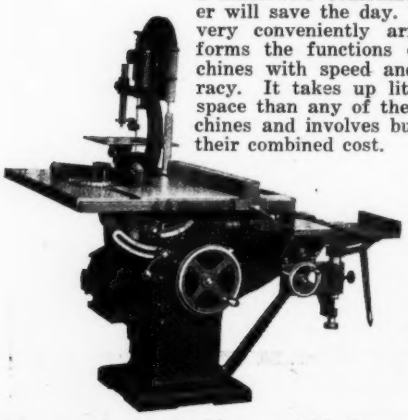
223 Rock St. **Mankato, Minnesota**



LITTLE GIANT MOTOR HEAD STOCK LATHE

When Either Space or the Appropriation is Limited—

a Tannewitz Combination Woodworker will save the day. Compactly but very conveniently arranged it performs the functions of several machines with speed and perfect accuracy. It takes up little or no more space than any of the individual machines and involves but a fraction of their combined cost.



It will rip, cross - cut — mitre — bevel — groove — joint — dado — rabbet — plane — band saw — mould — mortise and bore.

It's a man's size machine on which three people can work simultaneously with absolute convenience and an unusual degree of safety; quality built in every detail — 2 H.P. Motor — ball bearing throughout — completely guarded — attachments put in motion without shifting belts.

To fully appreciate this machine study it in detail. Write for bulletin E-2.

THE TANNEWITZ WORKS

Grand Rapids, Mich. **303 Front Ave.**

Always Specify Genuine

TRADE MARK

"Jorgensen"

REG U S PAT OFF

The Recognized Standard

Steel Spindles

Steel Nuts

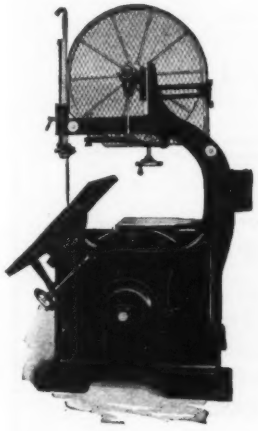
Maple Jaws

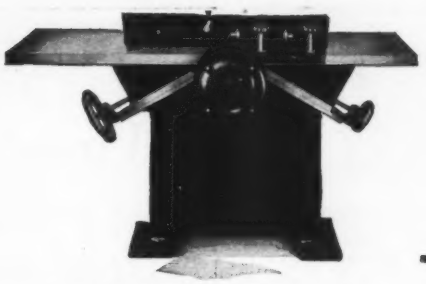
Adjustable or Nonadjustable
12 Sizes

Write for our Catalog No. 5-EE or ask your dealer.

ADJUSTABLE CLAMP CO.
417 N. Ashland Ave., Chicago, Ill.

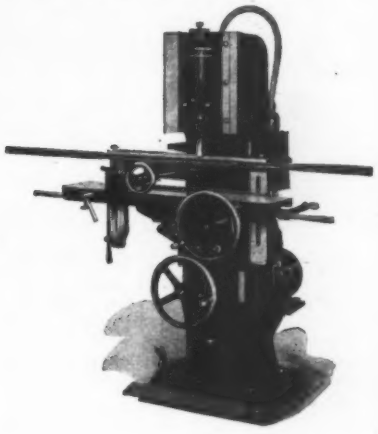
Famous 36-inch Band Saw No. 305 is safe, accurate equipment for the manual training school. Lower wheel is completely enclosed in steel doors. Frame is cast in one piece. Rockers supporting table are of steel, carefully machined and scraped.





The 12-inch P.W. direct motor drive jointer illustrated above is equipped with circular safety type head—a factor of great importance for manual training use. Easily adjusted and speedy and simple to operate.

The Famous Hollow Chisel Mortiser—below—is simple and rigidly constructed—easy to adjust—and substantial enough to stand the hard knocks it gets in schoolroom use without getting out of order—an ideal schoolroom tool.



Sidney Guarantee Makes Satisfaction Certain

No. 26 P.W. Motor Driven Saw Bench — illustrated above—is not only accurate—but it stays accurate even with the abuse that inexperienced students give it. Easily adjustable for a wide range of work.

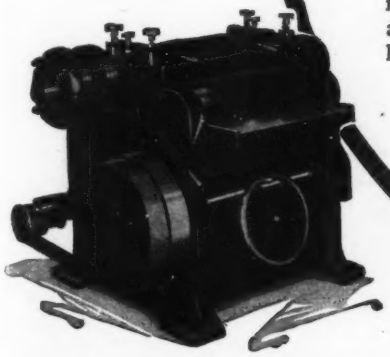
Practical Machines for Every Woodworking Need

One thing progressive instructors like about Famous Woodworking machines is that they are intensely practical. They're the same machines in every detail that the student finds later when he goes to work in production shops. He has nothing to learn over.

Moreover, every machine is as SAFE as human ingenuity can make it. Belts, knives and gears are enclosed or guarded to the highest possible degree—making serious accident practically impossible.

Again—they are sturdy in construction. Adjustments are accurately and strongly built, making them easy to set and very difficult to get out of adjustment even in inexperienced hands.

Sidney engineering staff will gladly advise with you about your shop layout and the selection of machines best suited to your needs. Write us about this service. It's Free. Address Dept. 406.



The Famous No. 371 motor driven planer is speedy, safe, and accurate. Yoke supporting cutterhead and motor cast in one unit, insuring permanent alignment. All gears and pinions are guarded. Wire mesh guards over outside belts without extra cost. Round, safety type cylinder.

FAMOUS LINE

The Sidney Machine Tool Co.

Sidney, Ohio

GTD

Little Giant

Little Giant Die and Collet

SCREW PLATES

Instruction now in the use of repair tools will stand every boy in good stead later. No matter what his future occupation, he will very likely have many chances to use this knowledge—around the house, in the garage, on the farm or in the factory.

Screw plates are indispensable where repairs are to be done that require threads. *Little Giant* Screw Plates, because of their simple design and careful manufacture, have acquired undisputed leadership in their field. Your teachers and pupils will welcome the addition of a *Little Giant* screw plate to your present shop equipment.

GREENFIELD TAP AND DIE CORPORATION
GREENFIELD, MASSACHUSETTS

School Representatives

R. A. FIFE CORPORATION, Mamaroneck, N. Y.

THE JOHNSON FRICTION CLUTCH

The Coming

Vacation Period

is just the time to install in your school

Johnson Clutches

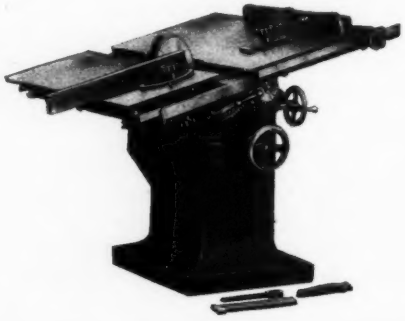
To Building Committees and Manual Training Supervisors: Take advantage of the summer vacation to install a Johnson Lineshaft Drive in your schools. Great power-saving. One-half less transmission equipment. One-half less friction. One-half less initial cost.

Single Clutch Exterior

Johnson installations in EIGHTEEN states are giving splendid satisfaction. James Monroe high school, New York, has just added 24 clutches. James Madison high school, Brooklyn, 28. Stuyvesant high school, New York, has 150. New York and Brooklyn school authorities now officially designate Johnson Clutches BY NAME in their specifications. Some clutch tribute! Full data and blue prints furnished cheerfully.

Write for Catalog "I.A.M."

THE CARLYLE JOHNSON MACHINE CO. MANCHESTER, CONN.



The No. 10 Crescent Saw Table is a sturdy, substantial machine with every convenient adjustment for general factory work and will meet every requirement for a practical saw table with self-contained motor for your manual training department.

Send today for circular giving complete description. Also ask for circular of band saws, saw tables, shapers, jointers, variety wood workers, planers and matchers, disk grinders, cut off table, swing saws, borers, hollow chisel mortiser, tenoner, universal wood workers, self feed rip saw.

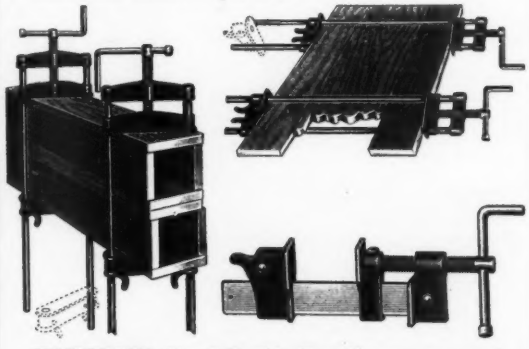
THE CRESCENT MACHINE CO.

25 Main St.,

LEETONIA, OHIO.

HARTFORD SINGLE DOUBLE BAR CLAMPS

Our No. 3 Hartford Double Bar Clamps are a decided aid in class work since they eliminate the possibility of buckling. Better results are accomplished when the danger of spoiling the work is minimized. The bar on each side of the wood maintains uniform pressure.



HARTFORD No. 6 Double Bar Clamps are used extensively as presses—for veneering, gluing posts, chair arms, etc. The cost is much less and the saving worth your consideration.

Single Bar Clamps are made in Loose and Stationary Handles.

Send for Catalog No. 10, which contains complete price list on single and double bar clamps.

HARTFORD CLAMP CO.

308 Pearl St. **Hartford, Conn.**

CLARK

FLOOR AND BENCH SENSITIVE DRILLS

DRILLS

BENCH TYPE

"Clark" Floor and Bench, Sensitive Type Drills are both rapid and accurate. Designed for light work, the 12 inch drills holes up to ½" diameter and the 16 inch to ⅝" diameter. It has a tool steel spindle, a ball thrust bearing, and is counterbalanced by a spring. The table is counterbalanced. It can be swung out of the way when desired. An index on column enables the table to be centered at any height. Friction disc drive permits quick adjustment of speed and keeps the power in proper proportion to size of drill thus avoiding breakage. A finished boss is provided on base floor type under spindle for convenience in centering long shafts.

Drill is complete with V block cup and point centers.

Write for complete "Clark" catalog and price list.

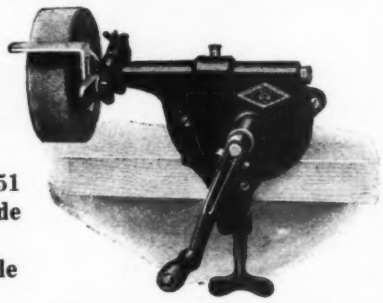
FLOOR TYPE

JAS. CLARK, JR., ELECTRIC CO.
663 BERGMAN ST., LOUISVILLE, KY.

"SOME DRILLS WEAR OUT — CLARK'S WEAR IN"

Sharpen Edge Tools
on a LUTHER TOOL GRINDER

Ask for catalog and prices.



The No. 51 Best Maide is the Best Made

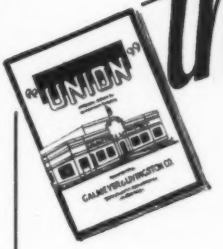
Manual training instructors, skilled mechanics, carpenters and pattern makers have found that Luther Grinders are the safest and most practical tool grinders made—excellent design and workmanship—a real quality product.

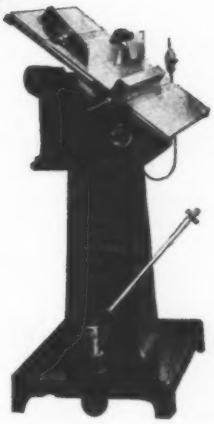
Grinder illustrated is our No. 51 Best Maide, ball bearing, swivel type hand grinder, equipped with combination (medium and fine) grinding wheel, especially adapted for grinding edge tools. No. 51 is equipped with 5x1½x⅞" DIMO GRIT grinding wheel and plain tool rest.

A special chisel and plane bit holding attachment can be furnished — insures uniform, accurate hollow ground bevel always.

LUTHER GRINDER MFG. CO.,
285 SO. WATER STREET,
MILWAUKEE, WISCONSIN.

In Step with the Times





Union machines embody the latest ideas worked out by specialists in modern wood-working practice. The Catalog will give you many valuable suggestions. Write for it now.

Modern woodworking plant practice should be taught in a modern way. Every student should learn, by actual practice, the most practical business methods of leading woodworking plants.

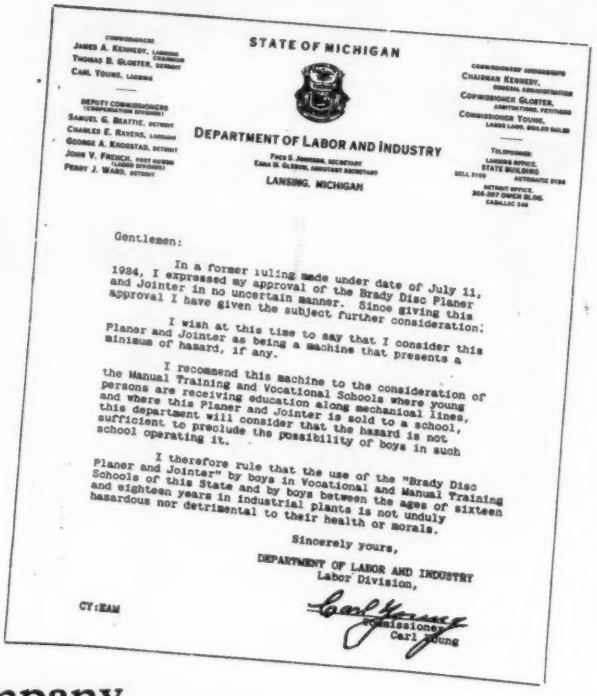
Up-to-date plants everywhere are using Union woodworkers. They reduce operating and overhead costs to a minimum, speed production and do better work.

Union machines cost less and operate more economically, they occupy less space and are portable. You can give every student actual practice by installing Union machines. They will learn more by doing than by watching. Let us show you why Union machines are more practical. Write for complete information.

GALLMEYER & LIVINGSTON CO.
214 Straight Ave. Grand Rapids, Mich.

UNION PORTABLE AND BENCH TYPE WOOD WORKING MACHINES

Approval of this New Type of Woodworking Machine



STATE OF MICHIGAN

DEPARTMENT OF LABOR AND INDUSTRY

LANSING, MICHIGAN

Gentlemen:

In a former ruling made under date of July 11, 1934, I expressed my approval of the Brady Disc Planer and Jointer in no uncertain manner. Since giving this approval I have given the subject further consideration.

I wish at this time to say that I consider this Planer and Jointer as being a machine that presents a minimum of hasard, if any.

I recommend this machine to the consideration of the Manual Training and Vocational Schools where young persons are receiving education along mechanical lines, and where this Planer and Jointer is sold to a school, this department will consider that the hasard is not sufficient to preclude the possibility of boys in such school operating it.

I therefore rule that the use of the "Brady Disc Planer and Jointer" by boys in Vocational and Manual Training Schools of this State and by boys between the ages of sixteen and eighteen years in industrial plants is not unduly hasardous nor detrimental to their health or morals.

Sincerely yours,

DEPARTMENT OF LABOR AND INDUSTRY
Labor Division,

CY:EAM

Commissioner
Carl Young

Literature on request—Dealers write for our Proposition

Brady Machinery Company

Traverse City Michigan

The No. 131 Motor Driven Variety Saw

The No. 131 Variety Saw has a Ball Bearing motor mounted on the saw arbor. Push buttons start and stop machine. With 16 inch saw will cut 3¼" thick.

Complete description sent on request,

Hall & Brown Wood Working Machine Co.

Broadway, Tyler, Ninth Sts. ST. LOUIS, U. S. A.

No cutting tool is better than its edge Keep the tools sharp

No. 475

PLURALITY OILSTONE TOOL GRINDER

THE most convenient, serviceable and efficient tool sharpening machine ever made.

This new Tool Grinder has been carefully designed to combine many new advantages with the essential features of older models. It combines five basic units in one machine: *coarse oilstone wheel, fine oilstone wheel, grinding cone, leather stropping wheel, emery wheel,* and all accessible from two adjacent sides.

It is motor driven, ball bearing throughout, and every unit is thoroughly guarded.

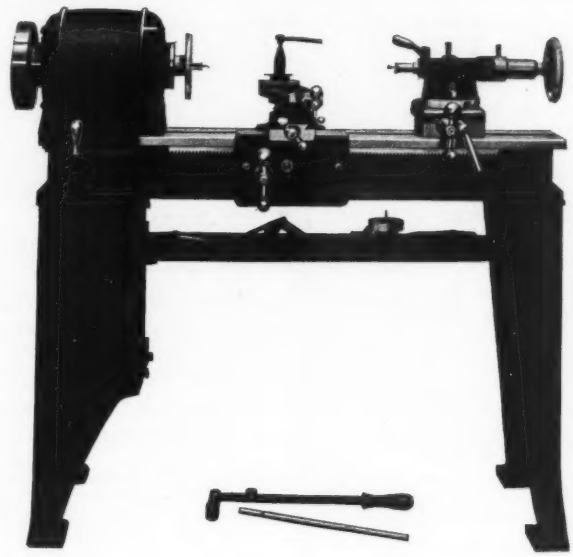
Write for full descriptive bulletin.

MUMMERT-DIXON CO.

Hanover, Pa.

Originators and Pioneer Manufacturers of Oilstone Tool Grinders

BLOUNT Motor Headstock LATHES



Utility!

Whether the student's work project be the simplest turning or the most expert pattern-making it can be accomplished on the Blount Motor Headstock Lathe with ease, rapidity, accuracy and a minimum of the instructor's valuable time. The range of practical instruction on the Blount Motor Headstock Lathe fitted with hand feed carriage, compound rest, and full setover swivel tailstock is virtually unlimited. Utility is paramount.

In attaining this wide utility there has been no sacrifice of other valuable features. Simplicity of design, sturdy, rigid construction, freedom from vibration, ease of operation and safety are characteristic of Blount Motor Headstock Lathes.

Descriptive catalog on request.

"Have proven their worth by their Service"

J. G. BLOUNT CO., EVERETT, MASS.

1845 — EIGHTY YEARS — 1925
Manufacturing Machine Tools

Thousands in use in shops all over the world giving daily satisfaction.

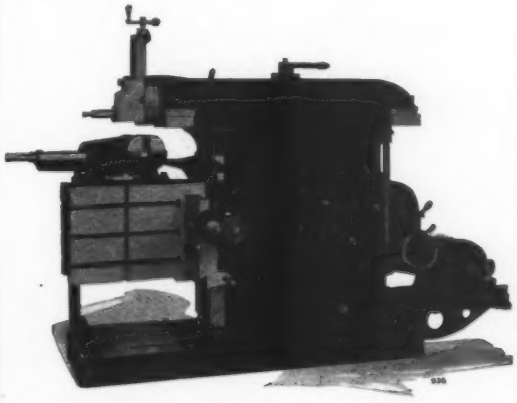
Meet the requirements of school shops because they are devoid of intricate parts and practically fool proof.

Send for catalogue describing the entire line of SHAPERS, MILLING MACHINES, LATHES and PORTABLE ELECTRIC SCREW DRIVER.

Industrial Education Dept.
THE JOHN STEPTOE CO.
CINCINNATI, OHIO

"OHIO" PLANERS and SHAPERS

Suitable for Tool Rooms, Production Shops and Vocational Schools.



The Ohio Machine Tool Co.
Planers and Shapers since 1887
— KENTON, OHIO —

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MANUAL TRAINING
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We carry everything in our block of sheds, and can furnish anything you want. No order is too large or too small for us to fill.

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We manufacture Black Walnut and other hardwood lumber, selling direct to schools.
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Consult us regarding your requirements
"A Dozen Boards Or A Dozen Carloads"
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We Furnish Schools With
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Aromatic Tenn. Red Cedar Boards—Small shipments a specialty. Write us for prices, delivered at your railroad station.
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THE Lumber Dealers whose advertisements appear in this Directory are specializing in lumber for woodworking departments in schools. This Directory is your buying guide for service.

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Cut from virgin timber, write
Ozro M. Wilsey, Franklin, Pa.
Dealer in hardwood lumber.
Chestnut, cherry and walnut a specialty.
Cherry—80% is. 18" wide. ½" @ $14. ⅞" @ $17. 1⅞" @ $17.
Chestnut—6 to 20" wide. 40% over 12". ⅞" @ $14. All over 20" @ $19.
Nearly any size in maple, oak, ash and hickory. Prices are for 100'. No. 1 stock, S2S, and freight paid to 600 miles.

OWN DRY KILNS — GREATEST VARIETY

FRANK PAXTON LUMBER CO.
Kansas City
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PANELS
Direct From the Manufacturer At Wholesale Prices

Large assortment of plain and figured woods in all standard sizes shipped promptly from stock.

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Free for the Asking—

SHEET METAL WORK—as an Industry—its Value as a timely Industrial Vocation for School Shops — the Projects — Aims of the Course — Sheet Metal Working Machinery — Application, and other things you would like to know are fully covered.

THE PECK, STOW & WILCOX CO.
Southington, Conn., U. S. A.

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You don't have to shop around when you buy of us. We carry everything from a rivet to the largest machine used for this work.

Ask Any Sheet Metal Worker

If you are not equipped to teach this course you should investigate. The sheet metal industries need skilled labor and need it bad. The work is healthful, the hours short, and the wages high. Let us send you literature on the subject.

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BERGER BROS. CO.

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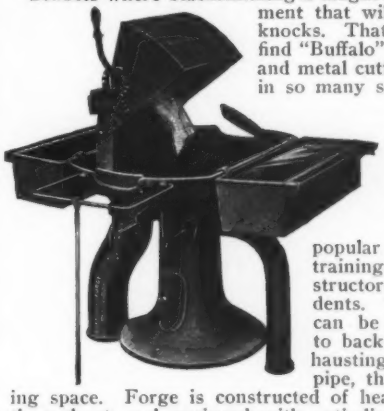
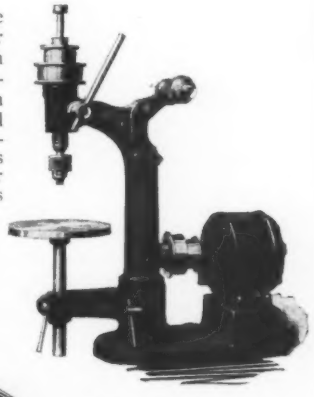
INSTRUCTORS PREFER "Buffalo" Equipment Because

Schools where blacksmithing is taught require equipment that will stand hard knocks. That's why you'll find "Buffalo" forges, drills and metal cutting machines in so many schools.



The "Buffalo" down draft forge shown here is the No. 90-D, very popular with manual training school instructors and students. These forges can be placed back to back in pairs, exhausting into a single pipe, thus economizing space. Forge is constructed of heavy cast iron throughout, and equipped with anti-clinker dumping tuyere which is controlled by a pull on the left side of forge close to the blast lever. Regularly furnished with water tank and coal box, and Buffalo Patented Down Draft Hood. Write for complete catalog.

At the right is the Buffalo 10" Junior Motor Driven Bench Drill. It has a substantial cast iron frame, finished, round table and several mechanical advantages found on no other bench drill. Motor is attached to the base as shown, and drives drill by means of a belt. Spindle speeds as high as 3000 R.P.M. if desired.



The Buffalo Armor-Plate No. 104B Combination Punch and Shear shown (left) is a very popular machine in schools doing metal work. It makes clean, accurate cuts to full capacity. Stripper prevents binding of metal. Frame of the machine is guaranteed forever. Also made in sizes 102B and 103B.

Buffalo Forge Company

482 BROADWAY, BUFFALO, N. Y.

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The rate for classified advertisements is $.07 per word per insertion, payable in advance. All wants subject to approval. Minimum 25 words. Forms close on 5th of the month preceding date of issue. Write for discount on yearly insertions.

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Basketry Materials—We carry a complete line of basket making materials including Kindergarten reeds, all sizes, round and flat, in one pound packages. Our line includes raffia, French willows, straw braids, Hong Kong twisted grass, basket bases, rattans, chair cane, dyes, etc. The Jayson Company, Inc., 217 Mercer St., New York City.

Basketry Materials—We have everything for basket making, including reeds, willow, chair-cane, Indian splints, ash splints and wooden bases. Send Fifteen Cents for Samples, 65-page Catalogue and directions. This contains illustrations of over 500 baskets, trays, frames, etc., with suggestions as to making them. Lewis Stoughton Drake, Inc., 33 Everett St., Allston, Boston 34, Mass.

Everything for Elementary Handwork — Also for basketry, weaving, bookbinding and chair caning. Mounting boards, Waldcraft dyes, crayons, burlap, scissors, punch and eye sets. Thomas Charles Co., 2249 Calumet Ave., Chicago.

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Manual Arts Supplies—Circular and straight knitters. Bookbinding Material, Bead Looms, Stenciling, Stick Printing and Batik Supplies, Wooden Napkin Rings, Plasticine, Flower Pot Moulds. Free Manual Arts Catalogues. J. L. Hammett Company, Cambridge, Mass.

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Vocational Text Books—For courses in Trade, Industrial and Manual Arts Education. Books submitted for examination (on approval). Write for descriptive catalogue. Dept. HS, American Technical Society, Chicago, Ill.

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Brush Making—A practical Special School and Manual Training subject. Send for our pamphlet which lists Bench Dusters, Floor Brushes, Mops, and other useful brushes, and tells how to make them. Magnus Brush Materials, 604 W. Lake St., Chicago, Dept. C.

Brush Materials—Brush Fibres, Tampico, Fibre Mixtures, Sterilized Horse Hair, Hair, Bristle and Tampico mixtures solid or taper stock, original lengths or cut to size. Samples matched. E. B. & A. C. Whiting Co., Burlington, Vermont.

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Special Service—We make it a rule to give special service on Cabinet Hardware for teachers. Send a postal today for our catalog. F. A. Rauch & Co., 410 S. Market St., Chicago, Ill. In one line of business for 41 years.

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Finest Quality—We have cane, reed, webbing, flat rush, for all kinds of chair caning. Send Fifteen Cents for Samples, Directions and Catalogue. Louis Stoughton Drake, Inc., 33 Everett St., Allston, Boston 34, Mass.

Caning Material—We carry an excellent quality of imported Chair Cane at very low prices. Also handle Basket Reeds, Rattan, Willows, Hong Kong Grass, Dyes, etc. Wholesale only. Samples upon request. The Otto Gerdau Co., 14 Lispenard Street, New York City.

CATALOG

Manual Training Supplies—Catalogue Number Five contains unusual items. Glue brushes, glued cedar for chests, cluster lampstands; parchment paper and shades for lamps; wire lamp frames, etc. Free to schools. National Manual Training Supply Company, 120 S. 8th St., Minneapolis, Minn.

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Clock Movements—chimes, dials, part of cases in the knock down, blue prints, designs, instructions, in fact, all assistance required by manual training teachers. Write for free booklet today. American Clock Company, Nicetown, Philadelphia, Pa.

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Catalog G.—New illustrated catalog on Drawing Stands and Drafting Tables. Suitable for Schools, Drawing Classes, Artists, Draftsmen and Engineers. The Washburn Shops of the Worcester Polytechnic Institute, Worcester, Mass.

FIBRE CORD

Art Fibre—See our full page advertisement regarding our complete Art-Fibre Weaving Service, Art-Fibre Cord, Stakes, Furniture Frames, Finishes, etc. Write for descriptive Folder. Grand Rapids Fibre Cord Company, Grand Rapids, Michigan.

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School Shop Instructors — Let your students beautify their furniture projects by using the Onward Sliding Furniture Shoe. Packed 6 or 12 in a box. Reasonably priced. Write Onward Manufacturing Co., Menasha, Wis.

"HARD-TO-GET" MATERIALS

"Hard-to-Get" Materials:—The most complete line in the entire country, of material which Instructors have difficulty in obtaining. Many of the items shown are our own design and manufacture and cannot be obtained elsewhere. We carry Upholstery Supplies, Cabinet Hardware, Chest Hardware, such as designs, bands, casters, locks and hinges; also K. D. Cedar Chests; Wood finishes, Novelty and Box Hinges, Wire Lamp Frames, Wood Lamp Shades. Eleventh annual catalog sent upon request. Thurston Manual Training Supply Company, Anoka, Minn.

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Leather for Bags, Cases, Pocketbooks, Fancy Leather Goods and Novelties. Wilder & Company, 1038 Crosby St., Chicago.

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Looms—Adapted for schools, hospitals and college use. Eureka rug filling, carpet warp, basket reeds. Send for catalog with price. The Reed Mfg. Co., Springfield, Ohio.

Lane Looms for Hand Weaving—Four harness, built in two sizes, 27 and 45 inches. Also 45 inch size in 4, 6 or 8 harness, for Hospitals, Vocational Schools, or home use. Circular sent on request. Nuttelman Mfg. Co., Florence, Mass.

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Modeling Materials — Plasticine, never hardens, Antiseptic, Ten Colors. Send for free sample. J. L. Hammett Company, Cambridge, Mass.

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Free Samples—We will send you free samples of all our reeds and raffia for school use. Catalog and directions, 15 cents. Louis Stoughton Drake, Inc., 33 Everett St., Allston, Boston 34, Mass.

We are the oldest reed importers in this country and solicit inquiries. Wholesale only. Also handle Chair Cane, Rattan, Willows, Hong Kong Grass, Dyes, etc. The Otto Gerdau Co., 14 Lispenard Street, New York City.

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Gem Stones for Jewelry Workers—Many interesting varieties. Assortments gladly sent on approval. George H. Marcher, 729 South Grand Avenue, Los Angeles, Calif.

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We have a wide variety of Tapestries and Velours, in all sizes, styles and designs. It will be a pleasure to send samples. Write us your wants. F. A. Rauch & Co., 410 S. Market St., Chicago, Ill. In one line of business for 41 years.

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Samples—We will gladly send you Free Samples of our line of upholstering goods on receipt of inquiry. F. A. Rauch & Co., 410 S. Market St., Chicago, Ill. In one line of business for 41 years.

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Wanted—One drawing teacher at once in every school to demonstrate the Ames Lettering Instrument. Free blue print and circulars will be sent to any teacher who sends us a postal request. O. A. Olson Mfg. Co., Ames, Iowa.

A publishing house is interested in securing the services of a young man having several years of teaching experience for commercial work in the school field. Applicants are requested to give their age, school graduated from, and teaching experience. Address M-3, Industrial-Arts Magazine, Milwaukee, Wis.

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Weaving Supplies — Looms, Roving, Jute, Warp, Macreme, Belfast Cord, etc. Free Weaving Catalogues. J. L. Hammett Company, Cambridge, Mass.

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The Pease Vertical Blue Printing Machine will turn out a steady supply of perfect blue prints whenever you want them, regardless of weather conditions, and at a faster rate of speed than is possible with any other equipment of this type. In addition to supplying you school blue printing requirements at lower cost, this machine will also enable you to handle outside blue printing work at a considerable profit.

Absolutely noiseless in operation, the Pease Vertical can be placed in one corner of your drafting room. So rigidly constructed that it can be shipped anywhere without danger of breakage and prints on either direct or alternating current.

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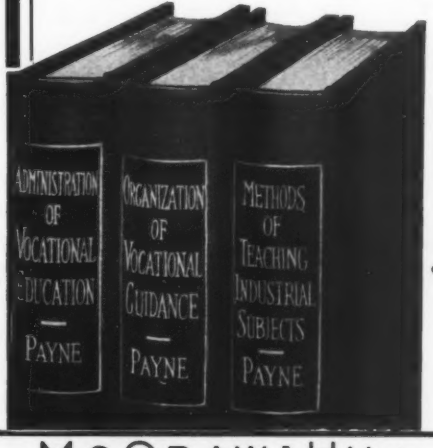

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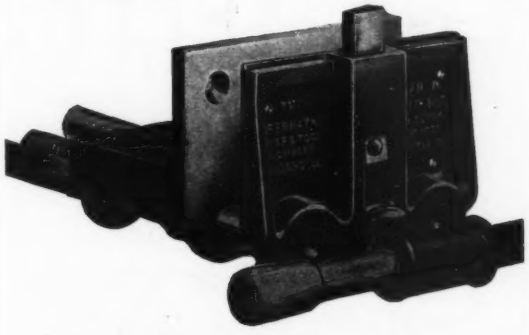

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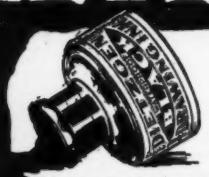

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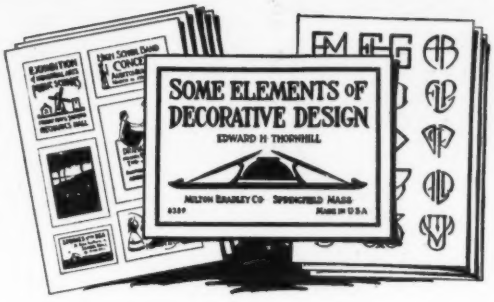

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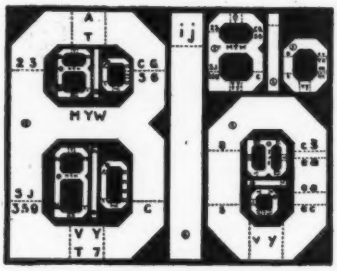

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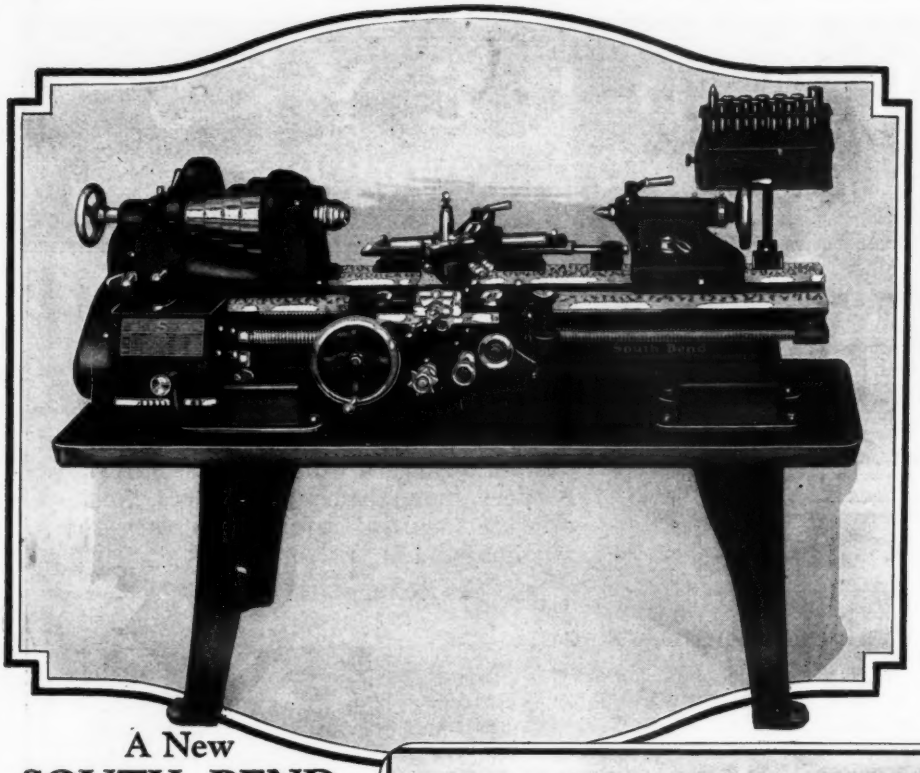

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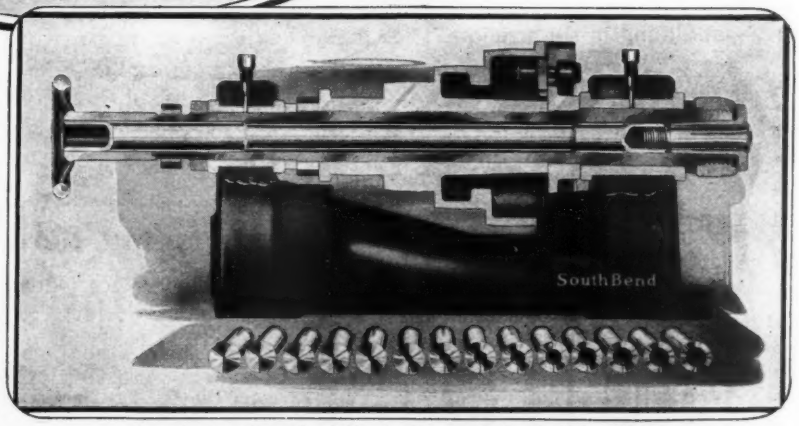

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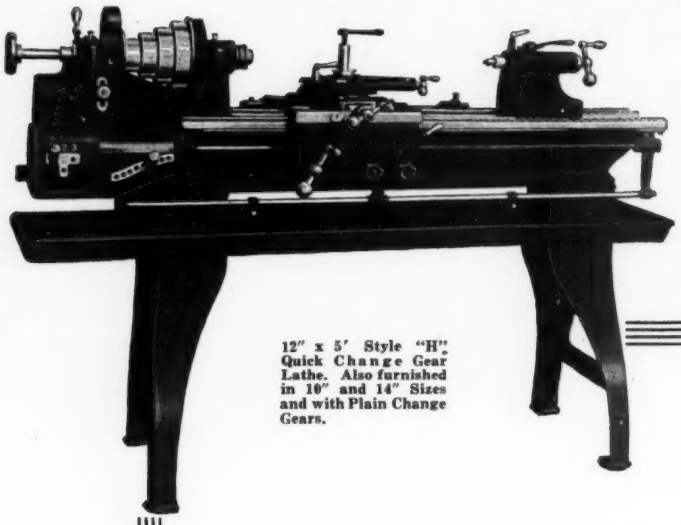

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THE INDUSTRIAL ARTS MAGAZINE

Volume XV JUNE, 1926 No. 6

An Argument for Industrial Arts in the School Curriculum

Arthur Feuerstein, Director of Industrial Arts, Rogers School, Stamford, Conn.

WHEN one considers that by far the great majority of people are engaged in occupations or professions either directly or indirectly related to the industries, and that practically all at some time have dealings with various industrial concerns it is difficult to understand the need for a discussion of this kind.

It is the writer's opinion that the entire need for this discussion is due to misunderstanding of the subject, industrial arts. There is, to a certain extent, justification for this misunderstanding. Industrial arts traced to its beginning in this country is not a new subject, but has been in a stage of evolution until at present Industrial Arts is about as much like "Manual Training" as man is like monkey.

Beginning in this country in 1887 it was introduced as a means of coordinating the mind and the hand. Its basic theories were entirely different from present-day theories. Wood as a medium for handwork was selected because of its adaptability as compared to other materials. At the start the only tool used was the sloyd knife. Gradually other tools were added and the work took on the appearance of carpentry. At no time in the history of industrial arts, however, has the teaching of a trade been the aim. The work took on the appearance of carpentry simply because of the nature of the material used as a medium for combining the activity of the mind and hand.

As industrial arts took on the appearance of carpentry its value as an aid in helping boys select their possible vocation was recognized. The question was raised then, that if industrial arts is to serve as a help in vocational guidance, it is also necessary that the work be not only carpentry but also elements of sheet metal, electricity, and concrete, printing, etc. In other words it was the beginning of the diversified shop, now common in practically all school systems, and which is entirely different from the manual training of twenty years ago.

Perhaps a discussion of what industrial arts is and what part it plays in the life of the pupil, may not be amiss at this time. Briefly it has four main purposes, which are

1. To afford the boy a means of expressing his ideas in some useful way.
2. To give the boy an opportunity of working and mingling with his associates.
3. To give him a knowledge of the uses of the common tools.
4. To give him an idea of the possibilities of the various trades and industries.

Let us consider the first part of the first aim, "to afford the boy a means of expressing his ideas." Every boy has some desire to build, to create, to do something to express himself. It is the privilege of those charged with the care of the boy to see that this desire is in the right direction. Expressed in this first aim is also the idea of interesting the boy in something to occupy his spare time and so form a basis for a hobby, or in other words a wholesome substitute for the poolroom, the craps game, and the street corner. Thus this first aim serves two purposes, i. e., as a means of expression and as a means of creating a worthy interest.

"In some useful way" must not be interpreted to mean that the project (his job) must necessarily be of money value in itself but of value as a means to the end. In the case of the boy who constructs a small electric motor, it may be a means of interesting him in the problems underlying electricity, wiring, motor construction, electric power, power conservation, safety, and other related topics. If the boy is making a small model of a boat or motor, he is naturally more interested and more observing of conditions surrounding that which he is constructing.

Apply this example to yourself. You perhaps pass seven or eight automobile show rooms on your way to business, you receive automobile circulars through the mail and throw them in the waste basket without reading them. But one day you decide to buy a new car and then you notice every showroom in town, study the circulars, and become deeply interested. It is the same with the boy. There must be a need before interest is aroused and industrial arts supplies the boy with the need for further study along worthy lines.

Take the second aim, "to give the boy an opportunity of working and mingling with his associates."

It might seem that industrial arts is not needed for this purpose inasmuch as the boy must naturally come in contact with his associates throughout his school studies.

If industrial arts is to serve this purpose it must be that it offers special opportunities for such interrelation. How does it do it? First, more freedom is allowed the boy in the industrial arts room. He is not confined to his desk (his bench), he goes about the shop using special tools, criticizing other boys' work, suggesting changes, receiving help from each other, acting as foreman of groups, taking a turn as tool boy, and in many other ways is an active member of the class and of the industrial arts department. Second, the industrial-arts department is so organized that the teacher is not merely "teacher" but the general manager of the organization, the guide, the helpmate of each boy.

This is not trade training but adapting the boy to meet conditions of later life. The shop organization may make it appear as somewhat like a factory but we must realize that organization is a condition that must be met throughout the boy's life. Whether he shall be a part of the organization or not, there will be times in his life when he will have dealings with some organization. Is it not necessary for him to know whether he should go to the common worker, the foreman, the manager, or the president of the company? The principles underlying all organizations are the same, be it a factory, a bank, or a club.

Again the question may be asked, "Cannot this be done in the regular class work?" To a certain extent it can and is done, but there are certain difficulties encountered in the classroom which make it undesirable and more or less impractical. The chief difficulty is the need of preparing the pupils for admittance to the next grade and to meet college entrance requirements. In order to do this a more or less definite amount of work must be assigned to each year and the work accomplished within that time. In industrial arts, strictly speaking, the boys do not advance by grades but according to the individual ability, knowledge, and skill of the boys. This can be accomplished only by individual instruction on the part of the industrial-arts teacher.

By stating that student participation in the organization prohibits the accomplishing of the allotted amount of work in the classroom, it is not meant that definite accomplishment is to be lacking in the shop. On the contrary, more is actually accomplished with student participation than without. Not considering one dissimilarity of the "regular" classroom subjects and industrial arts, this may seem paradoxical.

This dissimilarity is the attitude and interest of the boys with regard to industrial arts. Witness such facts as these: (1) In order to punish a boy for a breach of conduct in the shop it is necessary to have him *stop* his shopwork. (2) In conducting after school classes for boys who wish to do extra work, it is necessary to issue admittance tickets in advance. (3) Boys pay for or supply all materials. (4) In order to be able to attend a meeting of an exhibition committee held at the writer's shop, one noon-time two boys from another school but taking shopwork in the writer's shop, ate their lunch on the way over; two other boys went without lunch. (5) A class at the same shop which was omitted because there were insufficient teachers to conduct all industrial arts classes, asked permission to work after school. (6) A number of boys in a class from another school, but also going to the same shop and omitted for the same reasons, suggested that they might come over in the evening. (7) If assemblies are conducted at the time of an industrial-arts period and the attendance at the assembly is left to the boys, nine out of ten elect to go to the shop.

It is this sort of interest and willingness that makes industrial arts better fitted to teach organization than any other school subject. Because without the cooperation of all concerned in student organization it cannot survive.

Granted that industrial arts can carry out the ideas and principles of organization, what are the benefits derived therefrom, aside from the knowledge of the operation of organized bodies?

The chief benefit is the establishing of a sense of responsibility. Arising circumstances frequently bring out other points. A smaller boy is often the leader of a group of larger boys. Disputes regarding rights of others are brought out and the need of fair play is discussed and actually practiced.

This brings us to the third aim or purpose of industrial arts, "to give the boy a knowledge of the uses of the common tools." For a great many boys the school shop is the only place where an opportunity of using tools is afforded. This is due, to a certain extent, to the present conditions of living. The boy of today is deprived of many experiences his father had. In the building up of towns into cities and in the restricting of other districts, the home no longer includes a very large area of ground and a barn. It is true that in many instances the barn is replaced by the garage, but not replaced in the same sense that the boy has the privilege of using it as he did the barn. It is often true that although there is a home shop other than the garage, the boy is not permitted to use it. Nevertheless, the need for a knowledge of the use of the common tools has not disappeared. The home itself has not changed very greatly and there are numerous jobs which can be done if the common tools can be used.

The third purpose relates to the knowledge of common tools. Why then is it necessary to have machine equipment? Briefly, one answer to this question is the fourth cardinal purpose of industrial arts, "to give the boy an idea of the possibilities of the various trades and industries."

It is realized that all trades and industries cannot be represented, but as in the case of organization, there

are certain principles in machine operation that are alike.

The second reason for having machines is that they assist in carrying out the aims by doing a great deal of the work which after a very short time is just labor and not education. In this connection we must keep in mind the fact that it is not *skill* in the use of tools that is expressed in the third aim. Thus, by eliminating much of the hand work, more time is allowed for stressing the actual aims of industrial arts.

Granted that machine equipment would give the boy a knowledge of the principles of machine operation the question may be raised that, since the trade schools are equipped with machines, isn't that the logical place for fulfilling the fourth aim of industrial arts? This of course is assuming that there is a trade school in the immediate locality and that the boys will attend it.

This question is also disregarding the other purposes of machine equipment, but let us consider it that way for the present. In doing this we must keep in mind that the chief reason for the fourth purpose is to give the boy a pre-vocational attitude so that he may be better fitted to choose his life work.

In making a selection of his life work he needs the assistance of those who know his ability, his home conditions, his habits, and his desires. Who know these better than his regular school teachers? All that is associated with the boy's choice of his vocation must be related. To place a boy for vocational guidance in another school would be losing much. A card record might be sent with him, but a card record can never take the place of personal contact and acquaintance.

The communities having state trade schools are very fortunate. They serve a purpose which could not very well be included in the regular school system of the average size city. Their definite purpose is to prepare boys to enter *specific* trades as *skilled* mechanics. The trade school starts its work where the usual high school industrial arts leaves off. Neither its aims nor its work conflict in any way with the industrial arts courses of elementary or high schools.

As may be seen from the explanation of industrial arts, there is no possibility of covering the same ground in the regular school industrial arts work and in trade school trade training. The trade school may be likened to the specialist in the medical profession. If we are in need of medical attention we do not go immediately to a specialist. First, we go to an ordinary doctor who diagnoses our case and allows time for symptoms to develop. When he has diagnosed the case he recommends a specialist for special treatment. In this same capacity the regular school industrial arts course together with the rest of the school faculty act as the ordinary doctor to diagnose the pupil's case and to allow time for the pupil to find himself or in other words to let symptoms develop. After that the trade school or the college gives the special treatment. There is no over-lapping of studies, but rather a definite, progressive program leading the boy to his place in the world's activities.

There are other reasons why the trade school cannot take the place of elementary or high school industrial arts. Elementary or high school industrial arts is a course providing an experimental workshop for the boy. It is a workshop where he may make working models of physics problems, work out historic settings in connection with his regular history course, investigate and write upon industrial problems in connection with his English course, and so make his school work entirely related and purposeful rather than merely a gathering of facts which soon have no meaning, and often cause the statement that school knowledge is never used.

A trade school in preparing boys for a trade cannot allow for this experimental and related work. It is necessarily engaged in teaching technical methods so that the boy may be well fitted to meet the requirements of the trade when he completes the course.

There is also a psychological reason why the trade school cannot take the place of high school industrial arts. Pupils make a social distinction between the trade school and the academic school and hesitate to enter the trade school or the cooperative trade school and academic course because of this social distinction. This is not merely a local condition. New York City has found that its vocational, commercial, and textile high schools are not successful when separated in this manner. It is a natural situation arising out of a fear of class distinction. Buffalo experiences this same discrimination in attendance at its special schools.

By having an industrial arts course in high school and giving the boy a truer conception of industry than the average boy now has, it would be but a short time when attendance at the trade school would be larger. This attendance would comprise boys deeply interested in their work because of a better basic understanding.

At present of 621 high school boys in the writer's city there are but 22, or 3.5 per cent taking the high school and trade school cooperative course. In this course they attend a half day at the regular high school and a half day at the trade school. The other 599 or 96.5 per cent must necessarily have some other means of getting industrial information either for vocational guidance or for relating high school activities and giving a broader outlook on life.

This would not be a serious problem if the greater majority of the 96.5 per cent were boys who intended to enter professions not related to industry. But from surveys of other cities it has been shown to be just the reverse. The usual distance the trade school is located from the high school is also a consideration when the boy selects his high school course. Regardless of whether it is best for him to take the trade school and high school cooperative course, he also considers the conditions under which this course is offered. Meeting

the requirements of two schools with all that this implies, does not appeal to the boy.

During this discussion it has been the aim to point out wherein industrial arts is important and necessary as a part of the education to fit the boy to take his place in the world. It is the writer's belief that education does not consist of filling the pupil's head with a multitude of facts, but rather is it the purpose of education to guide the boy so that graduation is not "commencement" but merely a *continuance* of what he has been doing, living an actual life, and not what is commonly referred to as "school life."

Accident Prevention in School Shops

James K. Shallenberger, Brighton, Colo.

ANY plan looking toward the elimination of accidents must be specific in its application; no general campaign can function for the reason that there is no such thing as a general accident. Furthermore, our efforts must be directed against the causes, for assuredly so long as the cause exists, the results must inevitably follow. We may almost say that no inquiry into the cause of accidents has been made. The error involved in most efforts to teach safety methods in the shop has been our unthinking indictment of carelessness as the cause of injuries.

How fallacious is such a charge is apparent when we consider the possibility of injury in a day's work in the shop. It has taken us years to learn them; every new accident teaches us a new peril, yet we attempt to banish them from the boy by pointing out a few obvious dangers, together with the blanket injunction *"Be Careful."*

The fallacy in all this is that the boy is not careless but ignorant. How can he be careful when he lacks all the experience necessary to determine the dangers? The whine of the band saw, the wicked hum of a planer will dampen any bravado that exists in the high school youth. Its demand for respect is far more vociferous than any words of the instructor, but the old adage "Don't monkey with the buzz saw" is faulty because it leaves us in ignorance of just what "monkeying" consists.

The thesis of this article is the belief of the author that ignorance, and not carelessness, is the source of accidents; that to eliminate them we must banish the hazard; we must teach, not admonish. The following paragraphs will be devoted to an account of some of the hazards that beset the boy in the manual training shop, together with suggestions which may be useful in attacking each specific danger. The list seems long, yet it cannot be complete. It is not given to one man to observe all the accidents that can happen. In several years of shop practice and commercial work the author has seen accidents, or narrow escapes from accidents, from every one of these. They are not new. Any reader with experience in the shop will recognize them; but it is hoped that by itemizing the dangers in a list of this sort some aid may be offered in keeping them in mind so that a knowledge of them may be passed on to the class.

Methods of Teaching

The best method of teaching hazards to the class is an important consideration which cannot be answered by any definite formula. Any attempt to do so must seem didactic or categorical, yet it is the plan of the author to offer something specific upon which to build. There can be laid down a few suggestions as a skeleton outline, which may be modified or amplified to meet the conditions of the individual shop.

The time for instruction is just before the student is to encounter the hazard. Facts or rules regarding dangers cannot be assigned like a vocabulary in a Latin class. Any boy may glibly recite a list of "Don'ts" yet not be inoculated against the most obvious danger. The time to call attention to the danger is when he is given the tool to use. This frequently may be made a matter for group instruction, but whether group or individual, it must be made at the time he is to perform the operation which may result in an accident. The time to warn against cramps while swimming is not at Christmas when the boy gets his new skates, but in August when his cronies at the back gate give three shrill whistles and hold up two fingers.

The method, to be effective, must be brief; a short description in which the instructor need not hesitate to use the slang of the hour if it conveys the idea to the juvenile mind more aptly than precise English. This should be accompanied by a slow motion pantomime of the matters under discussion. When the class for the first time is given a chisel to use in the paring cut, call the class to the demonstration bench, grasp the board in front of the chisel, hold the tool as in starting the cut. Say "Boys, see where my hand is? What happens if my chisel slips?" Their answer will be quick and to the point. Continue then in slow motion to let the chisel "slip" and show its course across the back of the hand. No further lecture will be needed on that source of cut tendons. So in each case in one minute's time the various "accidents" may be illustrated as the tools are presented to the class.

When an accident happens in the shop never omit the opportunity to use it. Re-enact before the class the action of the affair, and if you make no comment other than "Now do you understand?" their answer will be a chorus of "We do," and that particular hazard is minimized.

Safety Signs

The value of signs is a mooted question. It is false, of course, to say that they are useless; yet too frequently upon them rests the whole crusade against accidents. The signs which allude to some particular hazard will have some value if conspicuously placed and properly worded. In this class we mention one which always commands respect—"22,000 Volts." The greatest absurdity is embodied in the sign "Be Careful!" This discussion is a crusade against that sign. To be effective any sign must be brief enough to be read at a glance, and when posted it should be promptly ignored by the instructor as a means of accident prevention. Any show window or scare-head advertisement must have a peculiar lure if, remaining unchanged, it continues to have an appeal.

The author once saw in an Arizona town a large sign over a machine, which read in substance, "The Board of Education of District No. 5 will not be responsible for accidents to students when using this machine." The mirth provoking possibilities of this sign are almost unlimited.

In general it is suggested that the time spent in preparing a neat danger sign may be more profitably used in removing the danger. A good padlock, a railing, or a shield will always outrank a sign as a means of accident prevention.

The Medicine Chest

The equipment of the medicine chest must receive careful consideration. The "first aid" kits on the market are not well adapted to the manual training shop for the reason that they contain too much material that will never be used. The shop instructor is not a surgeon and injuries which cannot receive final treatment by cleansing, a dose of iodine, and a bandage, should go to the physician.

The medicine chest should be carefully planned, easily accessible, never locked, and should be in its place on the first day of the school year. To use the medicine cabinet as a class exercise that may be finished by Christmas is carrying the desire for practical projects a bit too far. One common mistake in designing the cabinet is the making of too many pigeon holes and compartments. These only confuse when the quick finding of material is the pressing need. The material described below can be assembled in an orderly fashion in a case measuring about 5"x12"x16", though the better plan is to assemble the material and build a case to hold it. One shelf through the middle is sufficient. It should be painted white with a red or a green Greek cross on the door. The color scheme advertises it for what it is.

Its purpose and its use are among the few things in accident prevention that should be presented to the class in the form of imperative orders, to be strictly obeyed. The class should be encouraged in its use when the instructor is present, and only in the most immediate need if he chances to be absent for the moment. It should be explained to the class that the medicine chest is there for their safety and protection and it must remain in order and fully equipped; that anyone who uses its material needlessly or wastefully, or who pilfers any of its contents, jeopardizes the safety of every member of the class.

Adhesive tape seems to have a peculiar fascination for the 12-year-old and the high school athlete, so it is difficult to keep it in stock if strict rules are not invoked against its use except with the permission of the instructor. Little cuts and scratches need no tape; its function is not to seal wounds, and any injury which requires its use should have the supervision of the instructor.

Iodine is the one thing from the medicine chest to which the students should have unquestioned access at all times. It is an effective disinfectant which is safe to put in the hands of the child. Carbolic solution is dangerous for anyone but the physician, and peroxide is useless as a germicide. Besides the bottle in the medicine chest there should be a bottle of iodine accessible to the students at all times and without question. A block bored to receive a bottle and brush may be easily mounted in some convenient place. The class should be urged to treat every cut, scratch, or splinter with it. The size of a wound has little to do with the danger of infection. A little iodine is an easy thing to apply, but a little infection may be difficult to limit. Iodine should be bought by the pint and supplied without thought of niggardly economy.

The following materials will equip the chest with the things needed, without overloading it. A liberal reserve supply of all expendable materials should be kept on hand.

Equipment

2 Wide Mouthed Pint Fruit Jars.
3 Two-ounce Glass Stoppered Bottles for Lead Solution, Iodine and Aromatic Spirits of Ammonia.
2 Camel Hair Quill Brushes fitted with Wood Handles.
1 Scissors.
1 Tweezers Ground to a Point Similar to a Ruling Pen.
1 Tourniquet and ½" x 6" Dowel for Twisting.
1 Spool White Thread for Tying Bandages.
1 Enamel Wash Basin.
2 Oz. Iodine.
1 Oz. Solution Laudanum and Lead Sub-acetate.
1 Oz. Aromatic Spirits of Ammonia.
1 Bottle Bichloride Tablets.
1 Bottle Synol Liquid Soap.
1 Paper Safety Pins.
1 Roll Adhesive Tape—2".
1 Roll Adhesive Tape—1".
1 Roll Gauze Bandage—1".
1 Roll Gauze Bandage—1½".
1 Roll Gauze Bandage—2".

The two fruit jars, for gauze and tape, should have tops which fit reasonably tight but spread enough so they cannot stick. If the two-piece top is used, the top and threaded rim should be soldered to make it more convenient to handle.

Camel hair brushes are much better for shop use in applying iodine than cotton swabs.

The basin may be hung under the chest. Its capacity should be determined with a quart measure, so that a known strength of bichloride solution can be used.

Where the abrasion is large, as on "skinned" arms, iodine is too painful to use. This sort of wound is best treated with a bichloride bath and bandage wet with it. Mercury bichloride is very poisonous, but it can be used safely for bathing wounds if solution is made according to directions on the bottle.

The Synol soap is a good liquid soap to be used; more for its convenience and cleansing power than as a disinfectant.

The lead solution may be obtained on prescription from any doctor. It offers a considerable relief to pinched and mashed fingers and should be in every shop chest. Apply it with a camel hair brush.

Aromatic spirits of ammonia should be kept on hand. Fainting is not common in the shop, though we have seen a case or two. In the southwest it has a more important use as a first aid treatment for scorpion stings.

(To be Continued)

Foreman Training in Virginia

B. H. Van Oot, State Supervisor of Trade and Industrial Education, Richmond, Va.

THE rapid development of Virginia as an industrial state has caused an unprecedented demand for well-trained minor executives. The industrial managers of the state have called upon the state department of vocational education for assistance in the training of these executives and the latter has responded with a program of foreman training which, while not yet meeting the demand, promises considerable expansion in the future. Since this program of foreman training was inaugurated three years ago, nearly fifteen hundred foremen and prospective foremen have received instruction, over nine hundred of whom were in classes during the past year.

Foreman training was introduced into Virginia through the efforts of Mr. Raymond V. Long, former state supervisor of industrial education, cooperating with Mr. J. C. Wright of the federal board for vocational education. These men secured the interest and cooperation of the Virginia coal operators' association and put on a series of demonstration programs in the collieries of a few of the companies belonging to the Association. The results of these demonstration conferences were so satisfactory that additional conferences were held, first by Mr. Wright with the Stonega Coal and Coke Company, and followed up later by Mr. C. A. Sine, one of Mr. Wright's trainees, with the same company, only in different collieries.

There is no doubt about the effectiveness of the programs which Mr. Wright demonstrated for the coal operators. The success of these conferences and the good results accruing therefrom spread rapidly throughout the state, resulting in requests coming into the department of education from other industries for similar services. In response to these requests, a specialist in foreman training was employed by the state department of education to continue the work started by Mr. Wright and Mr. Long.

Six Aspects of the Program

The work Virginia is doing in foreman training has been quite widely advertised, not by the state department, but through the interest of those industrial concerns which have benefited by the conferences. Very frequently requests come into the state department from many parts of the United States and Canada for information relative to the foreman training work. Generally speaking these requests come under the following headings:

How do you get industry interested in your foreman training classes?
What are the arrangements relative to the hours of holding the conferences?
What is your program?
What are the qualifications of your conference leader?
What are the results of the foreman training work?
How do you finance the program?

The purpose of this article is to discuss these questions with persons interested in putting on similar programs in their respective cities or states.

I. *How do you get industry interested in your foreman training program?* The best answer to this question is to have a program of foreman training that is worth while, and then have its effectiveness demonstrated in one or two prominent industries. If the program is worth while and if it is demonstrated effectively the results will soon spread to other parts of the state. However, considerable initiative must be exercised by the local people who are interested in promoting the program, for even a good start will not always keep a good thing going.

In addition to this demonstration program we have found the following to be productive of good results:

Some Practical Helps

1. Personally visiting the industry and explaining the purposes of the conferences. In this connection it might be well to mention a few points in the interview. These are as follows:

a. No attempt is going to be made to teach the industrial managers how to run their industry.

b. Any trade or production secrets or processes, or any financial or social troubles which may arise during the conference will be kept confidential.

c. Production methods will be discussed only insofar as they pertain to the personnel relationship problems which arise during the conference.

d. Discussions will be confined to the topical outline which is submitted for approval.

e. The expense connected with the conference will be limited to the necessary stenographic and clerical assistance connected with getting out a report of the conference.

f. That the report of the conference will be used as future references for the men in the plant and will

not be distributed outside of the plant without the permission of those in authority.

g. That no radicalism, unionism or non-unionism, or other labor disputes will be permitted to be discussed in the conference.

h. That as the conference progresses, individual conferences will be held from time to time with the management to check up on the progress of the work and to formulate plans for furthering any points which the management may desire advanced provided they conform with the program as originally agreed upon. (The representative of the state will not advance any theories or ideals in favor of or against unionism or non-unionism.)

i. That the management of the plant or their representatives will be welcome to attend any or all of the meetings provided they do not monopolize the discussions. Any ideas which they desire to advance will be taken up in conference prior to the meeting.

j. The plant is to furnish the material facilities for conducting the conference (room, tables, blackboard, paper, chalk, and pencils.)

k. That no person will be embarrassed by requiring him to write. (Frequently in some industries otherwise efficient foremen are found to be illiterate.)

Addresses and Official Contacts

2. Addresses before Manufacturers' Associations, Rotary, Lions, Kiwanis, and Civilian Clubs, Chambers of Commerce, etc. [illegible] there are many things which may be interesting to place before such organizations, the writer has found that best results can be obtained if interest is centered upon one objective. A suggestive outline of such a talk, having foreman training as an objective, is as follows:

a. The need for vocational training for foremen.
b. The state's program for assisting industry.
c. The qualifications of the conference leader.
d. What is expected of the cooperating parties.
e. A topical outline of the points for discussion.
f. What use is made of the report of the conference.
g. The benefits which will accrue to all parties concerned.
h. The schedule. (The several plans for hours, time, etc.)
i. Where conferences have been held previously.
j. Offer to have individual conferences with any who may be interested.
k. The cost to the cooperating industries.

After an address covering the above topics given last year before the Virginia Manufacturers' Association, and followed up by personal conferences with those who expressed interest in the program, the state supervisor of industrial education of Virginia arranged for foreman training conferences covering a period of nine months.

3. Contact with school superintendents. In Virginia, many of the large industries are located in the small villages; that is, the school unit of administration is the county rather than the city. The county superintendent of schools is usually interested in doing anything that will establish his prestige in the community. Also, he is usually in a position to form contacts with industrial officials residing within his administrative unit. Inasmuch as the program of foreman training in Virginia is one which the county school board is not required to finance, the superintendent of schools is anxious to do anything within his power to encourage the program. Further, inasmuch as foreman training is a program of education, the state is exceedingly careful not to enter the county unit without first securing the approval of the county superintendent of schools. The same ethics hold true with the cities. The superintendent of schools is, therefore, an important personage in the advancement of a program of foreman training.

4. Publications. a. The state department of education of Virginia issues a small bulletin which describes the program of vocational education, including foreman training. This bulletin is sent with an accompanying personal letter calling attention to specific pages. Usually the letter contains some challenging question, the solution of which may be found in the bulletin. (No conferences have been definitely arranged through the use of this method of approach, though the same is of value in bringing the conference work to the attention of the industrial managers.)

b. Further, at the conclusion of each conference the management usually gives a banquet to the conferees and a few invited guests, (the conference leader or the state supervisor using their influence to have political as well as industrial leaders present) and a write-up of this banquet usually appears in the local papers. In a few cases several columns have been devoted to these write-ups.

Schedules of Conferences and Programs

II. *What are the arrangements relative to the hours of holding the conferences?* In Virginia there are three possible schedules. Most frequently the conferences are held on company time. The first objection one meets is that the foremen cannot be spared from their departments. Through inference, rather than by direct statement, the management is led to see that a foreman who cannot organize his room so that he may be absent a few hours a day for two or three weeks is just the one who needs foreman training. When the conference is held on company time the schedule is either three hours per day for two weeks, or two hours per day for three weeks—a total of thirty hours. The second plan is to divide the conference period between the company and the men; that is, the men meet for an hour and a half on their own time and for the same length of time on the company's time. In a few instances the companies have paid their men for attending on their own time. The third plan, used only occasionally, is to meet the men during the evening. Once, two conferences were held during the same period; the day shift meeting in the evening and the night shift meeting in the day time. This plan was not very satisfactory.

III. *What is your program?* This is a rather difficult question to answer. The general scheme is approximately the same in all industries, but the detail of application and the order of procedure have to be

worked out with the management after the conference leader gets on the job. Local application has to be made in all instances. In general, the following topics are discussed with specific application to local conditions:

a. An analysis of the responsibilities of each foreman.
b. Ways in which a foreman may cooperate with the management, other foremen and workmen.
c. The qualities necessary for leadership and how they may be developed under local conditions.
d. Responsibilities in giving orders, directions and suggestions.
e. How to make a work job analysis.
f. How to use a work job analysis in assigning work jobs, giving instructions, reducing accidents, increasing production, etc.
g. Carelessness on the job and how to eliminate.
h. How to deal with labor to reduce labor turnover.
i. Creating job interest.
j. The problem of supervision.
k. Production control and cost analysis.
l. Employee training.
m. The health of the worker.

(In putting across this last topic the State Department of Education has the cooperation of the State Board of Health which will send a representative on the day this topic is discussed.)

The methods employed depend largely upon the conditions present. The conference usually starts off with a short statement relative to the purposes of the conference, and by specifically stating that the conference leader is not going to try to tell the men how to do their production jobs better. The leader simply states that there are a few problems he would like to talk over with the men, and, beginning with those problems about which all have probably thought previously, he proceeds to ask a few challenging questions. These questions get the men to thinking and talking. As ideas are advanced they are placed upon the blackboard and discussed pro and con. When a point is settled to the satisfaction of the group it is placed upon a chart. A compilation of the material from these charts, together with introductory and explanatory statements, constitute the report which is mimeographed and given to the men.

Inspection and Rating

One or two examples taken from a recent conference will show the manner in which a group of men may be led to think about their jobs: When a group was asked to enumerate the reasons for inspection they listed out the following points:

Reasons for Inspection:
a. Insure perfect product.
b. Efficiency in management. (Balance of production.)
c. Efficiency of the labor.
d. Expenditure for labor and material.
e. Quality of material at different stages of production.
f. Quality of product in mass production.
g. Check on machines. (Locate imperfections in machines and processes.)
h. Prevent further work on parts already spoiled.
i. Classification of finished product according to established standards.
j. Elimination of unnecessary work in assembling.
k. See that no parts are lost in transfer.
l. See that records of the work produced check.
m. To guard against natural tendency of intensive production at the cost of quality or standard.

Again, when the men were asked to enumerate the points upon which a foreman should be rated, the following was developed:

Rating of Foremen:
a. Prompt repair and repairing.
b. Adequate supply of small parts.
c. Recommending replacements.
d. Overhauling to prevent unnecessary repairs.
e. Cleaning machines.
f. Shutting down idle machines, motors, and turning out unnecessary lights.
g. Overloading or underloading machines.
h. Operators changing machines without authority.
i. Checking speeds.
j. Number of idle machines and production demands compared.
k. Minimum time in changing machines.
l. Special arrangements for emergencies.
m. Suitability.
n. Proper grouping of machines and employees.
o. Economic spacing of machines, raw material, partly finished and finished products.
p. Treatment of employees, esprit de corps of department.
q. Recommending replacement of obsolete equipment.
r. Quality of product of department.
s. Degree to which he cooperates with others.

Many charts, graphs, diagrams, and tables are used in connection with these conferences, but space will not permit their being included in this article.

IV. *What are the qualifications of your conference leader?* The whole success or failure of a foreman training program depends entirely upon the type of man who is employed to do the work. Specifically, the outstanding characteristics should be as follows:

a. A good mixer—a man who can meet all people on their own levels.

b. A man who has had considerable practical contact with industry and who can talk the language of industry.

c. A person who can think just a little faster than the men in the conference.

d. A man who can express in clear, understandable English the ideas which men in the conference have, but are unable to clearly express.

e. A man who can sense the trend of thought in conference and direct it the way he wants it to go.

f. A man who is not afraid to work outside of conference hours. (Plant visitation, writing up reports, interviewing officials, making social contacts, sizing up possibilities for vocational classes, etc., etc.)

g. A man who understands the psychology of foremen and can curb the over officious and talkative without offense, and can encourage the timid and reserved.

h. A man who likes the work and does not indulge in meaningless platitudes and theories.

The success of the work in Virginia is due to the fact that she has the services of a man with the above qualifications in Mr. Linscott Ballentine, a trainee of Mr. Frank Cushman of the federal board for vocational education.

The Results

V. *What are the results?* As evidence of the results of foreman training in the industries of the state the following points are mentioned:

a. Thirty-three conferences have been held in Virginia to date. In every instance requests have been received from the management of these industries to

have the conference repeated with other groups of foremen and prospective foremen.

b. Quite frequently evening and part-time classes have been started. The conference program includes a block dealing with employee training which shows the need for vocational education. If the foremen appreciate the need for vocational education of the men under them, the matter of starting a class is merely a formality.

c. Support of the program of vocational education by the industries individually and through their associations.

d. Increased efficiency on the part of the foremen.

e. Organization of foremen clubs within the industry or in the community. In Lynchburg, Va., there is a foreman's club with over two hundred members in regular attendance, the formation of which was the outgrowth of a foreman training class.

f. Superintendents and other officials state that the methods employed by the conference leader are methods which they have adopted in conducting their own meetings.

g. Follow-up programs within the industry. In several instances leaders have been trained to continue the foreman training within the plant. It might be stated in this connection that the conference leader of Virigina is scheduled to conduct a *superintendent's* conference with the Newport News Shipbuilding and Dry Dock Company during the month of June, 1926. After the superintendents are put through the course, each superintendent will, in turn, conduct a similar conference with the foremen in their respective departments.

VI. *How do you finance the program?* The salary of the conference leader is paid from both federal and state funds. If the conference is in the form of teacher training (which it is when only one conference is conducted in an industry) both federal and state funds are used. If, however, a program is repeated within an industry, the work then becomes trade extension and that portion of the conference leader's salary is paid out of state funds only. In a few instances, local school boards have appointed a foreman trainer in their respective communities. In these cases, reimbursement has been allowed as in the case of evening or day unit classes, whichever the case may be.

There is no doubt in the mind of the state supervisor of Virginia that foreman training classes are one of the best methods of promoting a vocational education program. The results in this state have more than justified the expenditure of time and money. The conference leader is scheduled to conduct conferences six months ahead and if the results in the future are as satisfactory as the results in the past, foreman training will become a permanent program in the state.

Crossing the Twilight Zone

Laurence Parker, Kansas State Teachers' College, Pittsburg, Kans.

WE all have seen manual training instruction which was so practical in its operation that we exclaimed, "This comes close to being a trade work." We have likewise seen trade work which looked so much like old-fashioned manual training that we wondered if we had blundered into the wrong room. Yet the instructor declared it *was* trade work.

All this leads us to wonder just when manual training crosses the twilight zone and becomes trade training. It makes us wonder if the teacher himself does not do the crossing over from one line to the other.

As an attempt to prove that such is the case we are listing some conditions in a teacher which would tend to face him toward this twilight zone, move him toward the zone, or perhaps carry him over the line from manual training into trade training.

1. The manual training teacher is facing to the right when he spends his spare time getting acquainted with the community in which his boys must live and work; when he knows the foremen in the factories and the processes and operations in the factory at which his boys may sometime work. He will still continue to shape instruction to give these boys an appreciation of the dignity of labor. At the same time a degree of practicality will creep into his teaching, which will help his boys.

2. The manual training teacher is facing right when he insists that his boys keep tools in good condition and handle them in a workmanlike manner. Awkward habits of work can easily be formed by the use of dull chisels, plane-bits, and saws.

3. He is facing right when he is willing to work overtime to systematize his shop and see that everything about it compares favorably with the shops and tool cribs of industry. Nothing will help him gain the respect of the foremen of industry more than a carefully planned system in his shop.

4. The manual training man is moving toward this zone when he realizes that, back in the "eighties" when manual training started, wood was cheaper than it is now and was the commonly used material in the familiar things of life:

—When he realizes that making furniture is strictly avocational today—except in furniture manufacturing centers—and an expensive avocation at that.

—When he realizes that metals in sheets, bars, castings, and forgings have taken the place of wood.

—When he realizes that auto-mechanics and electrical work are foremost in the interest of many boys today.

—When he realizes that he is the one man in the community to impress his superintendent with the need of changes in the manual training work in order to bring it in line with the interests of the modern boy.

5. He is moving toward the zone when he is willing to leave his clean shavings and his methodical exercises behind and teach a "general shop" where boys learn to tinker the lawnmower, his "bike," construct bell-ringing transformers, and build a family garbage can, which is needed.

6. He is moving toward the zone when he realizes that he is teaching boys instead of manual training, when he realizes that each boy is different from all the others and will plan his instruction to give each boy his chance to follow the line of his interest and his aptitudes.

7. He is travelling toward the zone when he will spend his spare time planning instruction sheets which will aid him in teaching a room-full of boys who are at work on different "jobs." He will collect the lesson sheets now on the market and use them as guide posts in the preparation of the sheets that fit his boys and their interests.

8. He will be moving along when he will write information sheets which will, in some instances, tell the why of the work concerned in the instruction sheets, and in others refer to the book in the shop library which gives the information.

9. He will be moving along toward the zone when he will take his ignition class to Johnnie's home and "shoot the trouble" on the family car.

He will be getting along when he can interest his wood-working class in building a garage during spring vacation week "out on the job"—a contract, if you please, where all share alike in the profits.

10. He will be moving toward the line when frequent trips through factories are made, and when the factory foremen and engineers "return their call" bringing parts, drawings, or models to illustrate their talks upon the manufacture of their products.

If you are still "in the audience" and listening to this list of suggested changes and progress, you will, perhaps, agree that "it's a hard life" to live. It does seem so, if you are looking out of the window of a clean, sweet-smelling woodworking shop with a nicely planned set of exercises to follow—with a man coming in once a year to sharpen the tools.

To make such changes in one's life requires ambition which has been described as "the most uncomfortable feeling in the world—it keeps you on fire all the time."

Such changes come slowly and the wonderful thing about them is the fact that the teacher becomes a real part of the life of the community. As he nears the twilight zone, he ceases to be "a suit case teacher" in the town and becomes a part of it—with all the joys that are his because he belongs.

Present Tendencies of Shopwork for Special Class Boys[1]

Ben L. Slingluff, Philadelphia, Pa.

EDUCATIONAL practice in recent years has concerned itself largely with the promotion of a public school system which functions as a developer of the individual to the maximum of his capacity. As industry has become specialized so has the school unit adopted specialization. The junior high school, the continuation or part-time school, and the special schools for subnormals or delinquents have been developed and fitted into the school organization to serve best the homogeneous groupings of children. Specialization applies equally to the academic and to the activities subjects, although much of the traditional shop organization has continued as a "hangover" in kind, method, and content of work given. In the past, shopwork of similar kind had been given alike to the normal and to the subnormal whether he was feeble-minded or psychopathic. It was even quite customary to recommend the defective and the delinquent to industrial courses or industrial schools in the belief that participation in an activity would provide a cure, irrespective of the deficiency. Experience has shown the fallacy that all defective children could be reclaimed by this procedure. Participation in industrial processes only served to cover the defects by giving an external color and polish, but was not curative in the way demanded by a generous society which required a treatment guaranteed to give the child an equal chance for a contented place in life.

Much may be said of the results of the superior work done for the defectives in Philadelphia by Dr. Oliver P. Cornman, associate superintendent of schools, Dr. E. B. Twitmeyer, professor of psychology at the University of Pennsylvania, and Dr. Gladys Ide, director of special education in Philadelphia, who have applied modern scientific methods to discover and provide for the treatment of the kinds of youths which we shall indicate as "different."

A general classification of children of different mental equipment includes the idiots, imbeciles, and morons. A higher division gives us the dullard. The dullard should not be grouped as a high or super-type moron. He is a normal individual whose general vitality, movement, and attention are simply below the average. He is backward in school because the regular school is not fitted to his slow-witted needs. We have measured him with a yard stick designed and graduated

[1]Abstract of a Paper presented at the Pennsylvania Schoolmen's Week.

for the alert and quick-witted; he fails because of his limitation and handicaps, and must be given specialized educational consideration. Many of the dullard group have been forced into the truant group in an effort to obtain relief from an impossible solution of the boy's problems of school life. Before becoming a truant he could not keep pace with his partners in academic competition. Such also has been the case of the high-type feeble-minded. Both groups may profit by participation in organized forms of directed manual activity, in conjunction with specialized classroom work and diagnosis and treatment by physicians and psychologists.

Each group requires a different treatment. Each individual within a given group needs specific remedies if results are to be justified.

In shopwork problems and projects, two main classifications should be considered—the muscular development and the mental ability. The big boy of the class may have muscular development to carry a load or swing a sledge; the little fellow may have mental ability to manipulate simple fractions or combine words into phrases. Each may have both in degree or each may lack one or the other. Shopwork must contain tasks embracing both elements either separately or in combination, according to the individual.

The term tasks is used because successful accomplishment is more fully appreciated if the effort and labor expended in the attainment of any objective have been felt, slight though it may be.

A task should be difficult enough to demand interest and industry on the part of the worker, but not so difficult as to cause the interest to lag, or be sacrificed merely to illustrate some abstract or technical point.

The basis for determination of the kind of tasks rests largely with the teacher who, through observation and tests, is responsible for the improvement of those in his care.

What, then, should be the general purpose or tendency of the work provided and required in the shop? What of the character or type of jobs undertaken? The general purpose of the work should be to present elementary principles of construction and assembly in such a way that the boy's constructive instinct will be partly satisfied, to encourage him to do some thinking on his own account while engaged in his task, and to reveal to him some of the simple activities of the physical world in which he lives.

To the boy the finished product is the attainment of his objective. He gives no thought to the learning process, as such. He rarely admits that he is learning to play ball or learning to swim or learning to make a dug-out or learning the scientific principles underlying the construction of a kite. Everything he does is real to him and his gang. His attempt at achievement generally results in a finished product which bears the trademark of the novice—a crude example of the inventor's initial attempt at creation.

It is these elements that we must seize and convert into teaching material, realizing that the subnormal child, because he is different from his kin in the regular school, will be slow in his learning. He cannot be forced beyond the limit of his capacity. His limit of capacity, however, does not retard his ability to be happy. Encouragement tends to strengthen his desire for successful achievement in simple, interest-seeking tasks which may be assigned to him. Success in school paves the way for a starting place somewhere in the work of the world, when he passes beyond the watchful influence of sympathetic teachers, whose directing hands have supported him while he has developed the simple confidence necessary to make a beginning.

The world's work consists of both simple and complex jobs. Each kind of work must be done if civilization is to continue. For each kind of work there is always an applicant. Shopwork in the school for the different boy should aim to train in those elements which will enable him to obtain a fair start and remain in the community as a contented and happy individual.

So much for the purpose for which shopwork should be organized. What shall be the type or character of the work? Teachers of all subjects have long based their methods upon the principle that a child learns by doing rather than by memorization only. The principle applies equally to all forms and manner of learning. It begins in the cradle and continues for all stages of development. It was recognized by eighteenth century educators and is emphasized by psychologists of today. So we have discovered nothing new when we advise shopwork for boys whether they be normal or different. The type of work, however, has been changing, to meet the needs of the boy, especially of him whose native endowment is below par.

The projects or tasks for the course should include those things which assist the learner toward adjustment to his surroundings; to interpret his own experiences; and to appreciate his position in life with those of his companions. It should include problems and practices common to the life of the boy in a desire to awaken and promote his interest to his home, his community, and himself. Individual projects should be alternated with group or gang projects. Each should be adapted to the knowledge the boy already possesses. He develops more rapidly by estimating his own experiences, limited as they may be, to his home life whether of palatial courtyard or tenement side alley.

The kind of projects, constructed or assembled, require a shop equipment that is various in its adaptability. Wood, metal, concrete, rubber, leather, glass, and electrical appliances are the mediums through which the boy may be reached.

The work in wood should consist of the rougher forms of construction, as a dog house made to fit, shelter, and give comfort to its tenant may be of greater interest to the boy than a job which requires intense patience and

concentration, and the fine adjustments of the rule or the manipulation of a chisel.

A bench on which the boy and his chum may sit and discuss the latest in baseball or fishing is often more desirable and useful than a piano bench, poorly finished.

A boat that will sail offers many of the problems of construction found in a carved pedestal or stand.

Stilts of sturdy construction, sleds of the racer type, airplanes that have the appearance of the genuine are possibilities and desirable from the boy's point of view.

We must remember that construction work may be made extremely and unnecessarily difficult of solution by the addition of complicated dimensions, duplication of parts and manipulation of the chisel.

For the jobs requiring the use of metal, we should follow the same thought as for wood. Flat or sheet metal may be worked into many shapes of direct value to the boy. Corner irons of flat metal, drilled and countersunk, offer possible interests. Mending plates are easily made and are useful. A tin can may be converted, with some effort, into a scoop or a lantern or a model engine body. Hooks for the yard gate are easily fashioned into shape. Braces made of flat metal are always welcomed for the damaged coaster or wagon.

Electricity belongs to the twentieth century boy and should form a part of his directed experience. Little attempt, if any, should be made to confine his experience to technical and scientific language. Ohms law, resistance, conductivity, polarity, and the like do not belong to the matter to be taught the different boy. He is interested in knowing how the fire alarm signal on the street corner is operated—breaking the glass, throwing the key, watching the results. Install a simple fire alarm signal in the shop. Give him an opportunity to experiment with the complete job. It is a simple matter to cut a piece of glass to fit into the circular space of the ordinary fire signal. Have him use a red light or gong or both as a signal.

Connecting a small motor and applying wheels and pulleys that actually move are satisfying. Tapping a telegraph key and watching the receiver tell something of life; making a simple radio set and actually "listening in" have a lot of value.

Articles of concrete offer another channel through which the interest may be obtained and held. Many of the forms for holding the concrete mixture will be constructed necessarily by the teacher. We are thinking of concrete mixing and pouring for the boy and not of form building. Home plate for the baseball nine, flower boxes and bookends are suggestive.

Rubber and leather provide materials for further experiences. Patching the inner tube of the bicycle tire, or the inner cover of the basketball, or making washers for the school or garden hose are purposeful.

Leather collars for the dog or a belt for the boy are projects which contain simple problems in measurements and hook or buckle attachments. Making a joint and applying the hook to a sewing machine belt is worthwhile material for a lesson.

A very vital field of opportunities for shopwork of a general nature may be found in the home itself. Think of these projects and the problems within them.

Glazing a window.

Replacing a sash cord.

Fixing a common door lock.

Cutting, hanging and winding a window shade.

Disassembling an old clock.

Sharpening some of the common tools of the home.

Replacing knobs on kitchen utensil lids.

Repairing a piece of broken furniture or a toy.

Soldering a leaking utensil.

Cleaning the trap in a kitchen sink.

Renewing washers on a faucet.

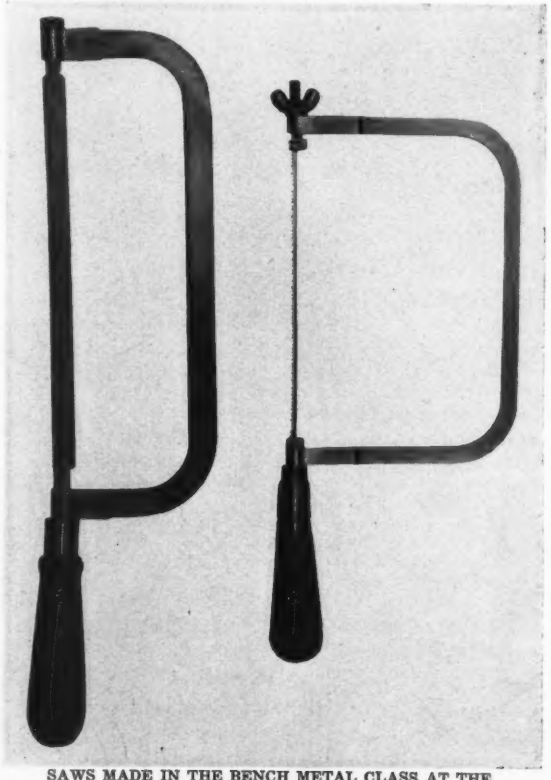
Cutting and threading a piece of pipe.

Assembling pipe fittings.

Have I enumerated sufficient tasks to get the interest of the boy who attends this special shop? Would he get a thrill from the completion of many of the tasks?

Could you weave a story of life around many of the topics?

If so, then we have a common understanding of the present tendencies of shopwork for the "different boys" in special classes.



SAWS MADE IN THE BENCH METAL CLASS AT THE BAY VIEW HIGH SCHOOL, MILWAUKEE. MR. GEO. W. BERG, INSTRUCTOR.

The Third Dimension

V. L. Sherman, Lewis Institute, Chicago

That character in fiction who became acquainted with a people of two dimensions, a people who could not perceive his bulk or the possibility of a third dimension, bears a slight resemblance to the average teacher of drawing. But there is another story, written by a well-known teacher of mathematics, and from this we shall take our text:

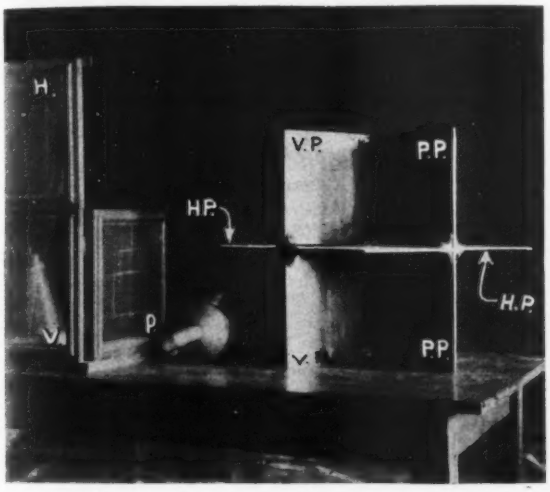


FIG. 1. TWO MODELS USED IN DRAFTING.

"They were learning to draw," the Dormouse went on, yawning and rubbing its eyes, for it was getting very sleepy; "and they drew all manner of things—everything that begins with an M—"

"Why with an M?" said Alice.

"Why not?" said the March Hare.

The Dormouse went on: "—That begins with an M, such as mousetraps, and the moon, and memory, and muchness—you know you say things are 'much of a muchness'—did you ever see such a thing as a drawing of a muchness?"

"Really, now you ask me," said Alice, very much confused; "I don't think—"

Three little folk living in a treacle well, and drawing treacle, and mousetraps, and memory, but muchness is the hardest and comes last, of course.

As a boy the writer delighted in drawing outboard elevations of battleships, but his delight was sent soaring when he stumbled on perspective and the third dimension. The discovery was so sudden and the contrast in possibilities so sharp that to this day he appreciates the confusion of the student in tackling that unknown third dimension.

This discourse is meant to furnish a dummy which will assist in teaching the art of tackling. It will include both the mechanical and the architectural sides in drawing because no student can master mechanical drawing without touching on perspective. It will take construction of perspective in another than the usual way so as to prove construction shown.

Probably the chief difficulty for the beginner in mechanical drawing is to bend his imagination to the parallel ray idea which is essential to comprehension of the problem. He has drawn elevations and plans, no doubt, as a youngster; but has very likely drawn houses with three sides visible and plans of houses with trees prostrate. His original methods were to compass the greatest detail with the least drawing, commendable practice but often confusing to anyone but the draftee.

To initiate the student, a box with hinged planes, a plasticine model, and two or three scratch-alls may be employed. The box is shown to the left in Fig. 1. The bottom and back are solid and carry a fixed, screened front which is marked vertical plane, V. The two side screens are hinged to the front and are the right and left perpendicular planes, P planes. Or side verticals, if you prefer. The top screen is also hinged to the front and represents the horizontal plane, H. P. The scratch-alls can be poked through the screen and into the model to hold it in desired position, and the lines projected from the model to the screen by another scratch-all. The shape of the model can be changed if clay or plasticine is used. Chalk is used on the screen in drawing, and the box remains closed until the projections are finished. Then the planes are swung into one.

The device to the right in Fig. 1 is used to demonstrate a little further in the matter of projection. Three blackboard planes are fixed rigidly and marked as shown. Then it is pointed out that, while practically all drawing is done in what is termed the third angle or quadrant, there are other angles possible if the planes of projection

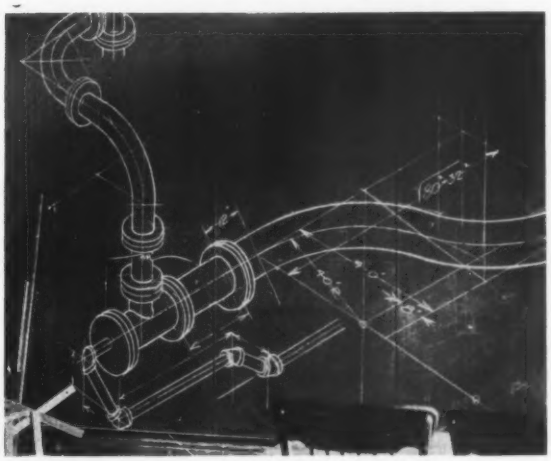


FIG. 2. PIPE LAYOUTS IN ISOMETRIC.

are indefinite or infinite. Specimen English drawings are presented, shown in the first angle projection; its reality is shown and chalked. American and English drawings are compared. Thereafter students rarely become mixed in their views. Without such instruction the very best will slip into grave errors in class work, and fatal errors later as draftsmen. It is easy to reverse on centers unless you know why you shouldn't.

When the work has so far progressed that the matter of design is introduced, it is found that small scale drawing is likely to "cramp the style." This fault is practically universal. The student never fails to skimp, or crowd, or to doctor his drawings rather than have it out. The cure is "full size" and some perspective. Here isometric is introduced.

Isometric as a general thing is not good perspective, and, outside of certain phases, of much less use (through stiffness and time expended) than ordinary parallel perspective; but for scale work on a blackboard with large

figures it is very comforting. Notice Figs. 2 and 3. The principles are fully explained and the student makes up an isometric scale for full size work. Such a scale is shown in the little "stop, look, and listen" sign at the lower left-hand corner of Fig. 2. For ease in handling, the vertical member is made heavy so as to strike its plumb position quickly, and a protruding nail is used at the joint so that the scale will swing easily from between the fingers. The blackboard used is about thirty feet long and about twelve feet high (from the floor). The work shown in the pictures, Figs. 2 and 3, is piping for boiler connections. Stinginess in flanges and curves is

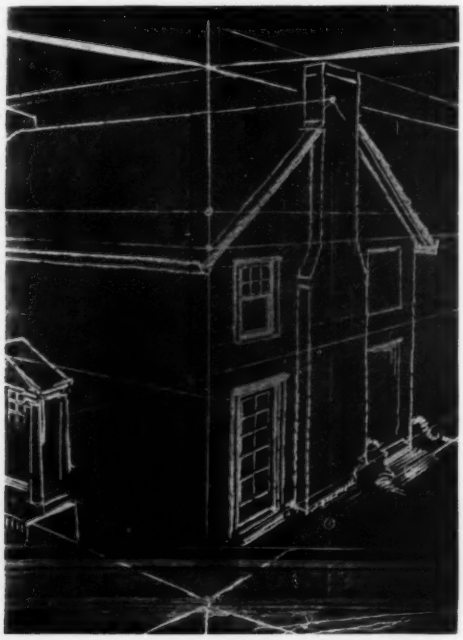


FIG. 3. SHOWING THE HOUSE PARTLY DRAWN. NOTICE THE TAPE ATTACHED TO THE BLACKBOARD.

impossible on the large board without a good laugh from the rest of the students. On paper, to a small scale, the discrepancies are so tiny that correction is usually without reason. This board also proves its worth for those working on automobile design; motors, clutches, drives, rear axles, frames, bodies, and their relations. In tool design the outlines of a milling machine can be presented and the available dimensions for a jig layout shown to the satisfaction of a student who is preparing for such a task on the drawing board. The large blackboard certainly does not cramp the style, and the use of isometric drawing with the little scale and cord is not as difficult as the constant hammering for correction of errors.

As regards perspective for architectural drawing we have an arrangement, shown in Figs.

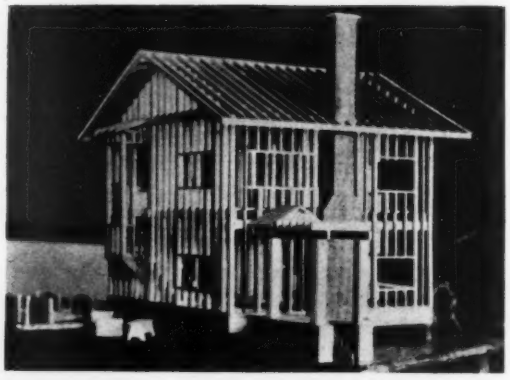


FIG. 4. MODEL HOUSE AND FURNITURE FOR USE IN DRAWING.

5, 6, 7, which seems to clear away some of the fog of the third dimension. We use the large blackboard and the floor space directly in front. (Along with the board work we use a model house, as shown in Fig. 4, and we keep the students busy later studying the framing for better or for worse, comparing it to framing in buildings under construction.)

First a semicircle is drawn on the floor with chalk, the center at the middle of the base board, as shown in the diagram, Fig. 5, and the photograph, Fig. 6. The proposition concerning right angle triangles based on a diameter and a semicircle, is gone into, and a point is selected the first time at random as a station point for observation, as at A, Fig. 5. The small house to be drawn then lies directly back of the blackboard with its nearest corner in the plane of the board; and since its sides are at right angles, they will be parallel to the lines AB and AC as shown in the diagram. Here the student walks up to the blackboard on the line AD and establishes the height of his horizon level with his eye, which is, of course, natural to him, but not likely the same for the other students. (The why of this will come in shortly.)

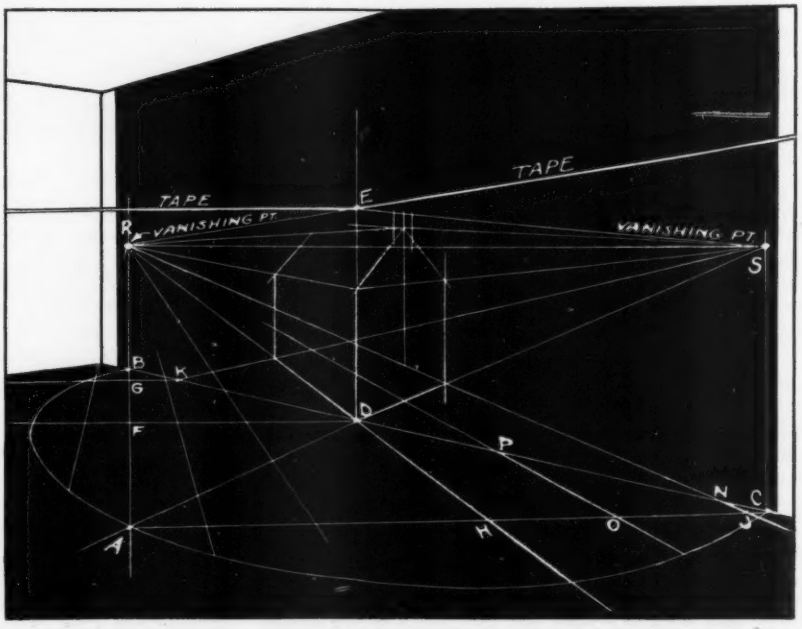


FIG. 5. DIAGRAM OF PERSPECTIVE FOR ARCHITECTURAL STUDENTS.

There is this, too, in isometric which materially aids the "plugger." Isometric drawing is not difficult to teach if simple models are used; isometric projection is done in parallel lines and gives a natural aspect, a combination which helps; isometric can be worked freehand and to scale on ruled paper. This paper, in varying sizes, is on the market, and has been used with good results for exercise work along with orthographic. But it is not real perspective nor real parallel perspective.

He marks the real heights of his model house on the line DE, for floor levels, sills, eaves, ridge and chimney. Then going back to the station point, A, he marks off his ground plan dimensions on the lines AB and AC as at FG and HJ. From these he runs lines parallel to AB and AC over to the base of the blackboard marking K, and N. To get the ridge in the middle of one side he locates the line OP parallel to and half way between HD and JN.

Using a mason's line well chalked, he loops it between his two vanishing points, R and S, which are established on the horizon line directly over the extremities of the diameter. A brass thumb tack holds sufficiently, and he snaps his line against the board from all the necessary

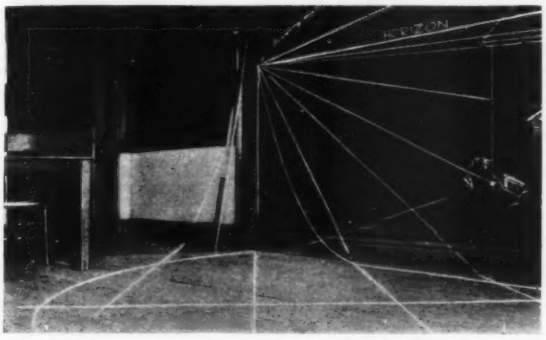


FIG. 6. LENS OF CAMERA AT STATION POINT BUT BELOW HORIZON.

points to his vanishing points. When this is done, he is sent back to the station point and given a short lecture on parallel lines and vanishing points, and is given a long straight edge. With his eye toward one vanishing point, directly above the station point and on a level with the horizon, he is made to sight from one end to the other along all of these supposedly parallel lines. Then he is convinced that they are really continuous straight lines so far as his eye is concerned (shown in the photograph, Fig. 7, and the left-hand side of the diagram). He stretches tapes from the top point on the board, E, to the wall. These tapes are parallel to the floor lines and horizontal. He then resumes the station point and sights along the tape and to the opposite vanishing point. When he is convinced of the last site, he is seated in a chair at the station point A. Thus, bringing his eye below his horizon, away go all the continuities, and only distortion shows. Notice Fig. 6. This proof that the line of intersection of all these planes, whose traces mark the parallel lines and their continuations to the vanishing points, must be level with the horizon seems to place the student in that frame of mind to grasp "muchness." He begins to see perspective.

After work on the blackboard from prepared plans and elevations, he goes back to his drawing board with the same set of plans, reducing his perspective to scale. Later he works the board with a larger perspective and a more distant station point. As the recession of the station point requires more distance between the vanishing points, a contrivance is used to spread the limits.

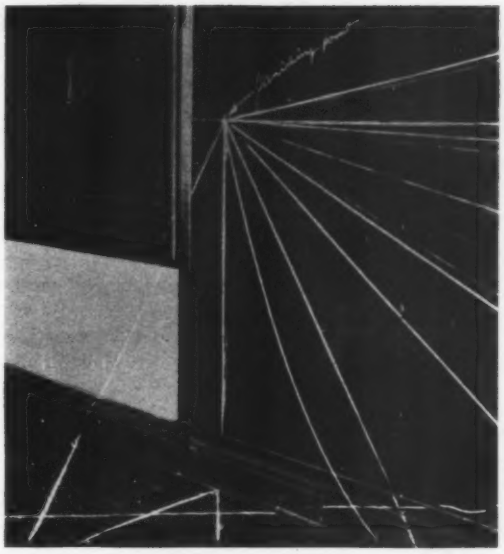
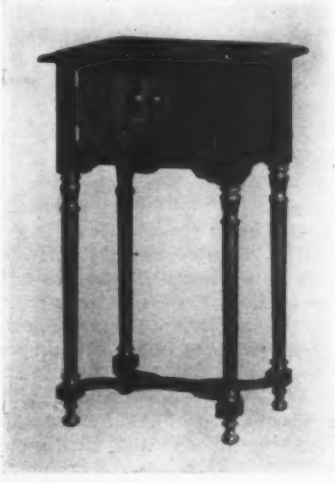


FIG. 7. NOTICE CONTINUITY OF LINE DOWN TO THE LEFT.

Wooden arcs are fastened to the trim at the ends of the blackboard. The radius of the arcs being known, the new vanishing points can be determined. A spool is attached to each end of the chalk line and these spools, running on the wooden arcs, bring the cord into position when it is stretched taut before it is snapped. Later the students use perspective in designing doorways, porches, fireplaces, and such.

It is possible that we make use of perspective work beyond the average. Scale perspective can be brought into nearly every design problem in mechanical drawing and engineering drawing to eliminate a great deal of false work. Roof framing problems worked on isometric paper solve themselves, literally; projects in the classes can be put before the student clearly but with no chance for "copy work"; appearance, balance, structure can be fairly prefixed in perspective, giving the student a basis for his problem and a chance to improve the detail.

As a parting suggestion let me say that for laying out stairs and frames in general the large blackboard is immense.



BEDROOM TABLE, DESIGNED AND MADE BY STUDENT, MILWAUKEE STATE NORMAL SCHOOL.

Some Home-Made Helps in Auto-Mechanics

Robert G. Grant, Appleton, Wis.

In the Basement After School.

Dear Pat:—

Your letter received and I note you failed to mention the "sparkling" gift to Adela. You can see that "confidential" news travels *anyway* and by all means the fastest way. May I offer congratulations and inquire as to when the date may be set for the "stepping-off process." I'm surprised you even took time to write me, as I suppose you are using *every spare minute* for the construction of furniture for the "future home."

So you are going to have a course of auto-mechanics in your school. Glad to hear that you are to be in charge of instruction. However, I note from the contents of your letter that you are quite worried and uncertain about the equipment needed, what type of organization of class work is necessary, and what procedure of instruction should be employed.

Pat, part of our public and teachers have the idea that the teaching of auto-mechanics requires no organization on the instructor's part. They really believe that the easiest course to teach in school is that of auto-mechanics. Their idea is that the instructor has the boys take a couple of old cars apart and then proceed to try to put them together again. Such false ideas, Pat, hurt our auto-mechanics courses, and it behooves us to correct these wrong impressions.

I am going to try to tell you how auto-mechanics is handled in our high school. Our method may be of some value to you in organizing your course of instruction.

We established our elementary auto-mechanics course in the tenth grade, as one of the compulsory subjects of that grade. Advanced auto-mechanics will be given as an elective in the twelfth year.

Our aim in this course, Pat, has been not to train each student to become an expert auto-mechanic, but to give all a thorough knowledge and function of *each* and every part of the modern motor car. In addition to such knowledge we aim to teach the proper repair with actual shop practice of the common home or non-garage jobs. I'll list a few such jobs: Greasing the car, grinding valves, removing carbon, relining and installing Ford bands (new or old type), packing a leaky-water pump, overhauling the rear axle, and many such jobs too numerous to mention in this letter.

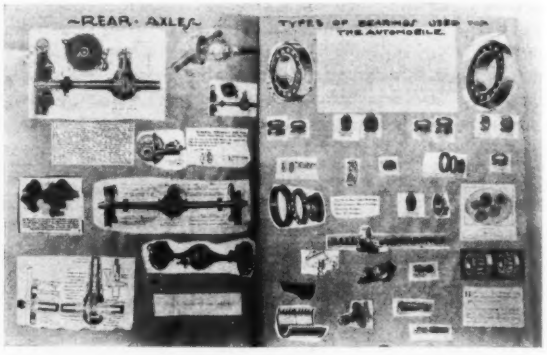
I want to say, Pat, that it is our belief that if the student knows every car part, its care and function, it will be quite logical that he will have a clearer conception of its proper repair; and consequently better repair jobs and better driving will result.

Starting our course we cover fully by lecture, with the aid of actual cars and parts, models, charts, etc., each and every part of the car. No part big or small is omitted with the exception of the more complicated electrical devices of car. The electrical part is thoroughly taken care of in our advanced course. I'll tell you about that course later as we are quite proud to be one of the few schools in this state to offer such a course in high school. No job is ever started by the student unless it has been thoroughly discussed in relation to its proper repair and function in the car.

Pat, if you should follow a lecture method, and lecture to your classes on the automobile, please keep this in mind: Don't try to cover too much ground in a few periods. You may be able to spread out over a great deal of the car in a short time, but in doing that there must be places where you will be *"pretty thin."*

We found it best to group the car into units and discuss thoroughly each unit and its component parts before proceeding to the next associated unit.

For example, we start our instruction with the foundation or frame of the car, to which are added the springs, front and rear axles, brakes, etc., until the entire car has been covered relative to repair, care and function of its units and component parts. The power plant in itself is composed of several units such as the cooling, the ignition, the fuel, and the oiling systems. To understand these systems thoroughly they should be studied separately.



SCRAP BOOK SHOWING ARRANGEMENT OF PARTS.

We use Kuns' Automotive Trade Training as our guide.

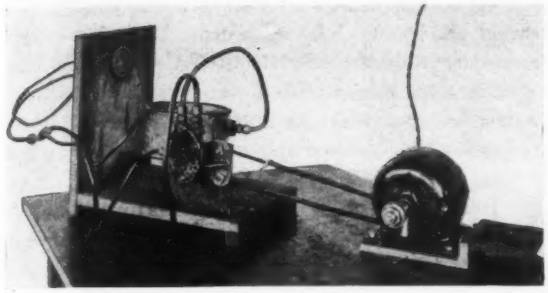
In connection with the lecture work we require the students to keep some record of the various car parts discussed. We accomplish this in a novel manner:

Each student makes a scrapbook. He posts into this book any cuts, mechanical drawings, and printed matter pertaining to car mechanisms and parts. This material may be gathered from magazines, newspapers, mail order catalogs, and car manuals.

Pat, I think you will agree with me that a scrapbook containing actual cuts and printed matter about them is more valuable to the student than an ordinary notebook containing hastily scribbled references and undecipherable freehand drawings that a boy may not half understand while drawing them. All cuts and material relative to the various units are grouped under separate headings. All data and cuts pertaining to rear axles are grouped under that heading. The same idea is carried out for all the parts of the car. (The cut shows a couple of notebook pages.) The students gather excellent data and are proud of their scrapbooks.

Tell me, Pat, what you think of the scrapbook idea. I've always told you not to think that I believe my way is the only way. They say we live to learn and I must say I'm still *young*.

As to class organization: we found some difficulty in providing jobs to go around. To remedy this difficulty we divided the classes into groups of three each. Jobs were given as group problems, with the exception of some individual jobs such as bearing, scraping, or similar work. This cuts down the number of jobs being done at the same time and allows the instructor to give more personal attention to each group job. It also assists the *spreading out* of the equipment and materially aids where

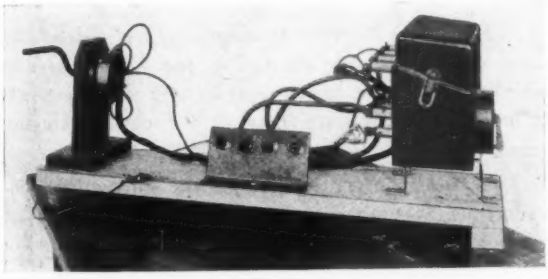


CHEVROLET OILING SYSTEM COMPLETE WITH ACTUAL CHEVROLET PARTS.

more than one class per day is taught. Only *one* of each group is permitted to draw out tools, and he alone is responsible for these tools, his job clean-up, and the care of job parts. This eliminates the denying responsibility or "Let George do it" habits.

The size of the shop determines somewhat the amount of equipment to be used. Our shop is small and we have room for only two complete chassis, namely, a Ford and a "Chev." Just imagine *how easy* it would be for the instructor *to teach* or have 20 boys tear down and put together those two cars.

In order to have plenty of non-interfering or overlapping jobs, we built (the photos show some) and mounted separately certain units of the car. These units were to include oil, water, fuel and ignition systems. With the aid of these units, you are able to give exactly the same jobs that would occur on the car itself. Furthermore, these jobs are available at any time and are not dependent on and do not interfere with a chassis job in construction. Different types of units may be mounted thus, giving a larger variety of unit types without chassis increase.



COMPLETE FORD IGNITION UNIT (GENUINE FORD PARTS USED).

With most jobs we use a job sheet. After covering all parts beforehand by lecture and demonstration, the job sheet may be intelligently followed. Where each job has been finished by the group, the group is given a questionnaire on which several important questions concerning their job are asked. These questions are to be answered in written form and really are an examination which permits them as a group to thrash out the questions together.

Pat, I haven't tried to list the equipment needed for a course. If you are to have a small shop and a limited equipment, I would suggest you add in addition to what I have mentioned, a couple of bare engines and a rear axle besides your demonstration devices. One of these might well be a Ford. This permits the changing of bands and planetary transmission jobs without disturbing the regular Ford chassis.

Well, Pat, here it is five minutes to six and I'm still at school. My wife will be thinking I must have a couple of teachers' meetings and maybe it will be cold beans for me tonight.

Hurriedly yours,

TOM.

SELLING PRINTING TO JUNIOR HIGH SCHOOL STUDENTS

C. E. Moe, Instructor of Printing Walter H. French Junior High School, Lansing, Mich.

For the past four years in the teaching of printing in a vocational and senior high school, I pondered over the seeming aversion of students to the print shop. I have overheard students say, "Aw, I don't think I'd like printing because all they do is set type." I realized they had the wrong idea entirely. In analyzing the situation I also analyzed myself, to see whether it was the subject that was distasteful, or if I didn't know my business. I found it rested with myself due to the fact that I was evidently not making the subject interesting.

In coming to this conclusion it appeared that I was not altogether to blame, due to the demand upon the print shop for various commercial jobs. I also found that I was not making my subject interesting. Due to that the students who did elect printing did not do any boosting, and as a result, the print shop enrollment suffered. Perhaps this is also true regarding other printing instructors, perhaps not, but I am inclined to think it is.

The first steps which I took to remedy the situation were in the directon of making the subject in the shop as interesting as only printing can be made. The origin and development of printing form a story that is full of romance and interest. The uses to which printing is put as the "art preservative" also constitute a subject that helps to make mere type setting take on a new character.

The possibilities of design and color, the help of printing to the academic studies carried on by the boys—all these matters and others were used indirectly and directly to vitalize the subject and, if I may use the term, to "sell it" to the members of the class.

The printing instructor has a decided advantage over other manual arts teachers due to the fact that the print shop product reaches more individuals, and usually the kind of product will determine the popularity of the course. The medium through which the printing instructor can reach the student body is the school paper. Through the school paper interest in printing can be stimulated.

In thinking over the situation I determined to see if this could not be done. With the help of the art department of the school we have succeeded quite well. I realized that a plain, printed school paper, regardless of the fact that the makeup and presswork were good, would not interest the student body to a large degree, so I decided to have a picture symbolic of the month or holiday, cut from a linoleum block, and to run it in color as a background on the front page. Students became interested in the paper as we have never seen before.

There are six grades housed in our junior high school and a large number of them have subscribed. Many now stop me in the halls and ask me when the next paper will be out. Through this interest stimulated I expect when they reach the junior high school age, printing will no doubt be as popular as any of the other courses.

At the beginning of the school year there were but fifty enrolled in the printing course, calling for only three periods, while the other manual arts courses were filled to overflowing. This second semester over one hundred have enrolled and are keenly interested. Even after school now one would think there was a class going on, due to the number that desire to do extra work.

INDUSTRIAL-ARTS MAGAZINE

E. J. Lake S. J. Vaughn

Editors

TAKING STOCK

This is about the time of year when school people begin preparations for the final inventory. Soon the footing up of the year's business, checking up of the stock on hand, and the estimates of the costs, etc., will be undertaken.

While all this is in progress, would it not be a good thing for the teacher to "take stock" of himself and of his work for the year? Would it not be well for the teacher to analyze his efforts and weigh the results, and see whether or not he has made the very best of his opportunities? Have his methods been satisfactory? Has he wasted time, energy, material, and opportunity? Has he permitted friction to develop between himself and his superiors in authority? Has he thrown his life whole-heartedly into the life of the school and the school system in which he has been working; or has he been disposed to say, "Well, my business is in my shop or classroom; I don't meddle with the other affairs of the school"?

Now is a good time to evaluate all these considerations. At this date one can have a pretty clear perspective of the year. If friction has developed, now is a good time to smooth it out. In all friction, somebody or some condition is at fault. This is a good time to find out who, or what, or why it is. No wise supervisor is deliberately going to do the stupid thing of permitting a good teacher to leave his department or system with no very valid or just reason. Good teachers are too scarce. In the closing weeks of the year, like the last lap in the race, almost anything can be done. Snarls that have crept in during the year may rather easily be straightened out. Friendships lost may sometimes be regained. Quality of instruction may be materially improved. Supervisors may be convinced of a higher grade of ability and of service than they had previously given credit for.

By this time, teachers should know whether their services have been satisfactory to the officials who pass on such questions. There should be no abrupt and late dismissals. Such surprises should never be "sprung." Knowing the situation, any teacher should improve the opportunity now, to have a fair and accurate understanding with those who do the employing. There should be no grounds for argument, no occasions for complaint, no reasons for bickering, and no causes for unprofessional actions.

In case a teacher has not quite succeeded to the satisfaction of his superior in office, there should be no reason whatever for ill feeling. Indeed, many a time such superior in office recommends rather generously a teacher who has not fully succeeded. He is fair enough to concede that unforeseen conditions, some hasty judgment, or some more or less minor error on the part of the teacher, may make an impossible situation for the teacher in that particular system, without rendering him unfitted for a position in another system.

Taking stock, then, should reveal to the teacher all the things which have aided him in his work, as well as those things, or conditions, which have hindered his progress. With the facts before him as a result of self-analysis, he should be able to proceed intelligently in the matter of making plans for the next year. This is just as true of the matter of holding or seeking a position, as it is of the matter of courses of study, methods of teaching, or the materials of construction.

There is probably a good position for every good teacher. And every teacher has at least the opportunity to be a *good* teacher, when he is placed in agreeable surroundings with adequate facilities. There should be no hesitancy, therefore, in making a thoroughgoing analysis of self, of successes and failures, and of methods, and then facing the issue fairly and squarely. It is only by such a procedure that real progress is made in the last analysis.

THE ATTITUDE OF SCHOOL PEOPLE AND THE PUBLIC TOWARD THE INDUSTRIAL ARTS

It is not an unusual thing for teachers of industrial and shop subjects to make rather anxious inquiries concerning the general attitude of school people and the public toward their work. It is a perfectly natural inquiry.

If one were disposed to answer on the basis of the noise and the popular discussion, one would be compelled to admit that the interest in such subjects seems to be waning. However, noise and discussion are not a true index.

Practically every subject in the curriculum has undergone the same experiences that have come to manual training and vocational education. A period of great apparent interest and fervid discussion has been followed by a quiet, sane acceptance of certain underlying principles, and a constructive attempt to put such principles into operation. Then the general public accepts the necessity and success of the work and immediately gives its attention to something else.

Many people can remember the great agitation that arose over the introduction of socalled nature study into the public schools. It was the subject of every parent-teachers' association, every teachers' meeting, and every educational address. Some were certain that the whole elementary school fabric was in danger of immediate destruction. Others were alarmed lest such "useless and faddish" subjects should drive the "three r's" and the "real" subjects out of the curriculum.

Now, although one never hears a discussion on nature study, it would be a queer school system that did

To be Mimeographed for School Shop Use Only.
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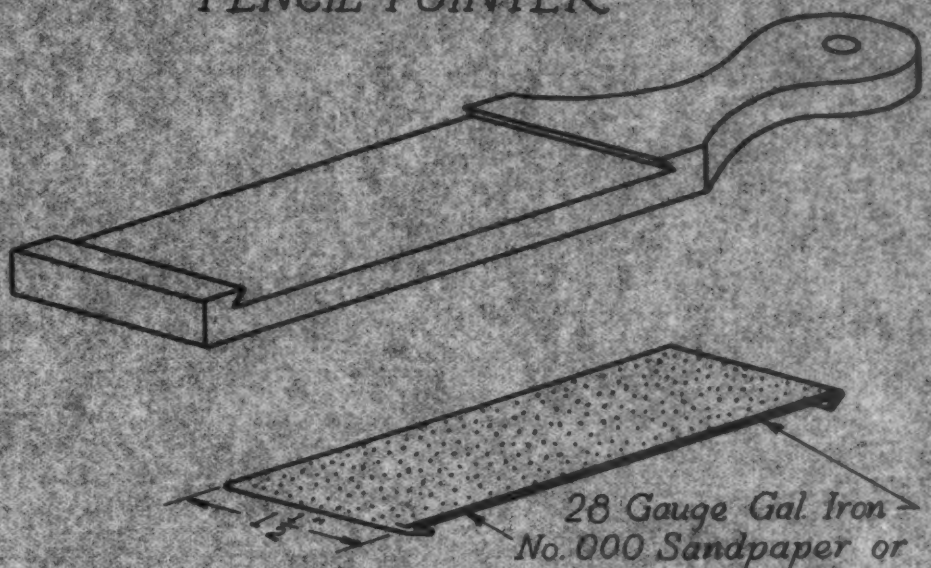
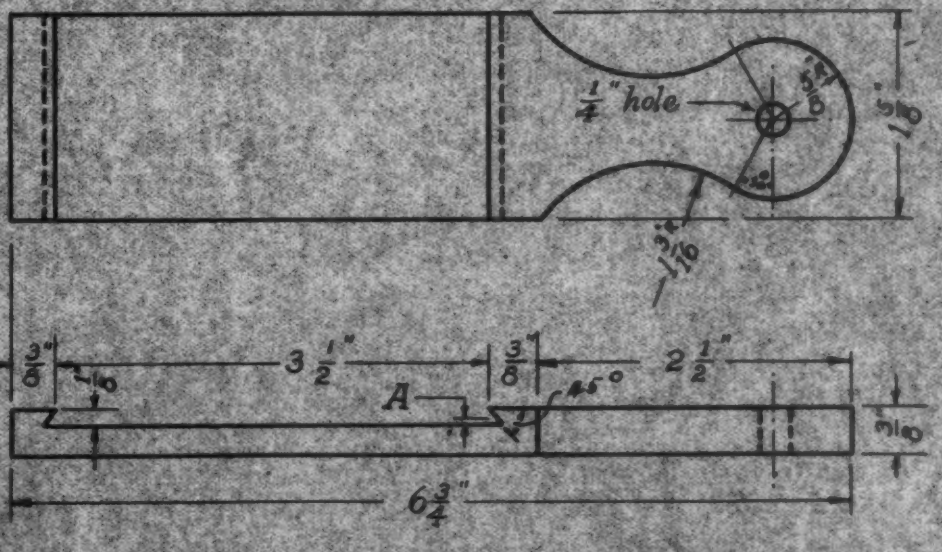
PENCIL POINTER





A = Width of saw cut

Designed by Wallace R. Grothause.

For Details see Page 213, Industrial-Arts Magazine, June, 1926

not incorporate in its courses vastly more "nature study" than the most rabid enthusiast of a generation ago ever dreamed of.

A similar thing, we think, has happened in the field of manual, industrial, and vocational education. The time of feverish interest, reactionary opposition, and universal discussion has passed. The educational world has seen to it that such work has been given its proper place in the curriculum. The over-emphasis of the earlier day on such work has become unnecessary. A lot of things are now taken for granted. The general public thinks of such courses in the same way in which it thinks of arithmetic, nature study or history.

The problem now is for the teachers of these newer subjects to see that they must not be permitted to be taken so much for granted that they fall into the same difficulty that overtook the older subjects like arithmetic, namely, the difficulty of becoming abstract, lifeless, and static. It has taken the last two decades to revive the almost lifeless forms of arithmetic, grammar, and history. Eternal vigilance is not only the price of liberty, but of everything else that is worth having.

VOCATIONAL GUIDANCE

Guidance must be really guidance, with a maximum of awakening and enlightenment and a minimum of control and prescription. This is an age when the educational world is well stocked with machinery for doing things *to* children; guidance is solicitous to find ways and means to awaken children to do things for themselves. When pupils are all tested, examined, classified, enrolled and graded, when buildings have been provided, teachers engaged, books distributed and courses of study formulated, we have but been *preparing* for our work; the real task of guiding and educating children has yet to be begun.—John Brewer, Harvard University.

THE COUNTRY LAD STUDENT

Your country boy comes to high school or college with a very good start in mental development. Aside from his fund of information, he has gained the faculty of observation, he has had to think things out, to reason, and, above all, he has felt responsibility. The town-bred boy may be keener and quicker in his mental processes, but he lacks the foundation that comes from closer contact with the mainsprings of life. Your country boy can leave the farm and scenes of his boyhood, build on that his later education, and go anywhere in the big city and win his way. The reverse process is rarely possible. Few town-bred boys can turn their backs on city streets and take up country life with success, even though they may have the inclination. It is a wonderful advantage to have been born and reared in the country and on a farm.—E. E. Elliott, Salem, Ore.

MISSION OF VOCATIONAL TRAINING

"The work of improving conditions in modern business is ours. It belongs to the average man and woman. Practically all the prominent positions in business and government will in the not distant future be filled by men and women now in the obscure walks of life—especially in early life. That is the way things work in America. The noted man of today was the obscure man of yesterday, and his place will be taken tomorrow by some other man from the unknown multitude. There are no great men. We are a nation of average men, and every great work here must be done by average men and women."

—Frank Marsland, New York.

BEAUTY AND UTILITY

As more and more we have mechanized the processes of production, we have run beauty out of business and compelled it to take refuge in the side streets of the world, in the obscure shops of craftsmen who are wistful survivors of an age in which artisans aspired to be artists.

We haunt antique shops and pay absurd prices for ancient articles in a pathetic effort to prove that we can at least appreciate a beauty we are no longer capable of producing.

The personal significance of beauty in an age of hectic haste lies in the fact that nothing can bring quite the relaxation and soothing calm of spirit that beauty brings.

The social significance of beauty in an age of unrest lies in the fact that every accession of beauty to the life and work of mankind is a body blow at discontent, a preventive measure against the spirit and action of revolution.

We dare not make utility and ugliness synonyms.—Glenn Frank.

A TEACHER'S CODE TO SUCCESS?

Don't smile, laugh, or enjoy yourself; if you do you will be thought easy or simple.

Be rough, be gruff; for, if you don't, you will be walked upon and kicked out of the way.

Be stern; almost insult certain ones; go around with a bold, bristling exterior and boo them all back.

Bite nails; don't be quiet nor timid.

Stamp down your heels hard; don't slip around on quiet rubber heels.

Kill 'em dead with every look.

Slam around, and then you will amount to something whether you do or not.

Push, haul, shove, if you would not be caught in a whirlwind and be swished away to a mean protecting nook, there to suffer with other too gentle beings.

No use being mild and quiet and sensitive nor to try to heal your too fine feelings.

If you would succeed in this tusseling, bustling, heartless current of life, be and do all this, plus.

—R. A. Loomis.

How much dependence you can place on a man depends on how big a "jam" he might get into, and how big a "jam" he will stand without losing his mental balance.—*William Maxwell.*

CARPENTRY "BRAIN-WARPERS"

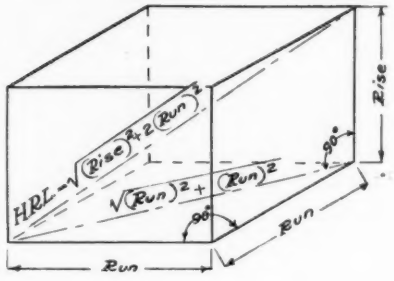
Charles P. Coates, Los Angeles Schools

Work for maximum score of 100[1]

I.

Given: Length of common rafter, ten feet (10).
Pitch of roof, three-eighths (3/8).

Determine: Length of hip-rafter.
Blade reading for side cut of hips.



$$H.R.L. = \sqrt{(Rise)^2 + 2(Run)^2}$$

$$= \sqrt{(36) + 2(64)}$$

$$= \sqrt{164}$$

$$= 12.8026 = 12'\text{-}9\tfrac{13}{64}''$$

$$Blade = \frac{12.8026 \times 12}{8} = 19.209$$

FIG. 1.

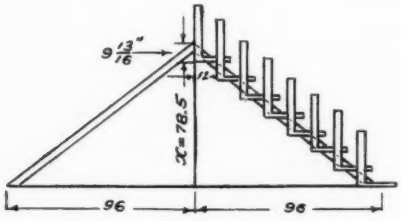
Hint: Derive formula for length in terms of rise and run of roof.

Score = 30.

II.

Given: Run of common rafter, eight feet (8).
Nine and thirteen-sixteenths on blade (9 13/16) gives plumb cut of common rafters.

[1]The "Brain-Warpers" are published as a sequel to the "Monkey-Puzzlers;" Cf. **Industrial Arts Magazine**, 13:391, October, 1924.



$$96 : x :: 12 : 9\tfrac{13}{16}$$

$$12x = 942 \quad Rise = 78.5$$

$$H.R.L. = \sqrt{(78.5)^2 + 2(96)^2}$$

$$= \sqrt{24594.25}$$

$$= 156.8255 = 13'\text{-}0\tfrac{53}{64}''$$

$$Blade = \frac{156.8255}{8} = 19.6032$$

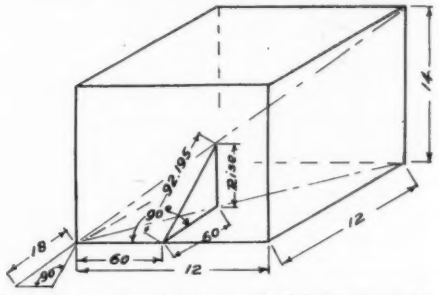
FIG. 2.

Determine: Length of hip-rafter.
Blade reading for side cut of hips.

Score = 40.

III.

Given: Pitch of roof, seven-twelfths (7/12).
Length of hip tail, eighteen inches (18).



Jack Rise : Roof Rise :: Jack Run : Roof Run

$$Jack\ Length = \sqrt{\left(\frac{Roof\ Rise \times Jack\ Run}{Roof\ Run}\right)^2 + (Jack\ Run)^2}$$

$$= \sqrt{(Jack\ Run \times 2\ Pitch)^2 + (Jack\ Run)^2}$$

$$= \sqrt{8500} = 92.1954 = 7'\text{-}0\tfrac{1}{16}''$$

$$Jack\ Tail = \sqrt{\tfrac{1}{2}(18)^2} = 12.728 = 12\tfrac{47}{64}$$

$$Blade = \sqrt{(14)^2 + (12)^2} = 18.439$$

FIG. 3.

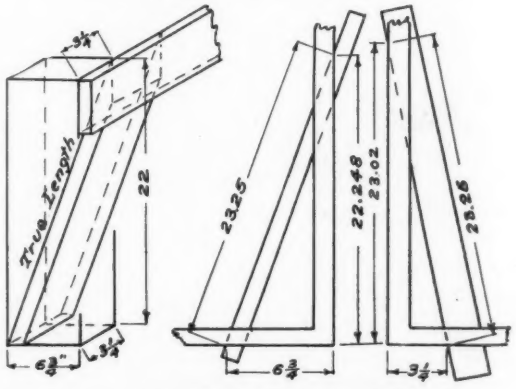
Determine: Length of hip-jack placed sixty inches (60) from end of plate.
Length of hip-jack tail.
Blade reading for side cut of hip-jack.

Hint: Derive formula for length of hip-jack in terms of roof-pitch and jack-run.

IV.

Score = 60.

Given: True length of saw-horse leg, twenty-three and one-fourth inches (23¼).



$$True\ Length = \sqrt{(Rise)^2 + (Run)^2 + (List)^2}$$

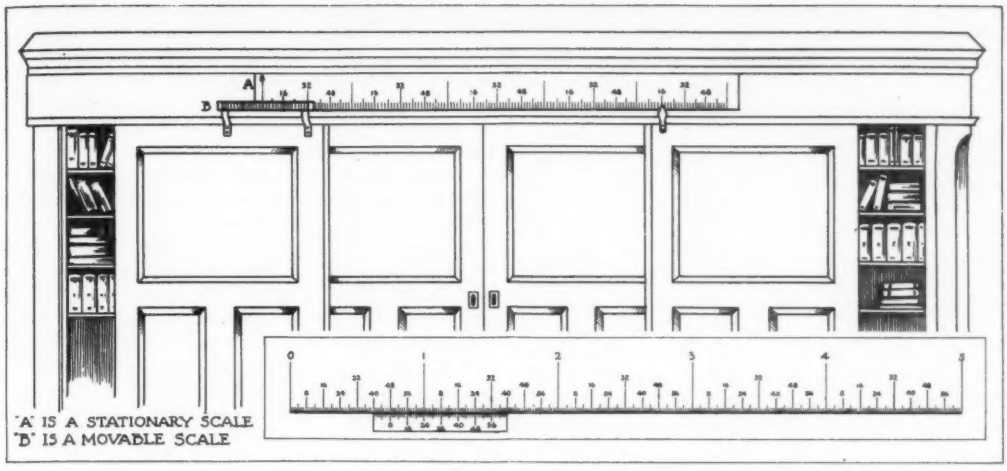
$$23.25 = \sqrt{(Rise)^2 + (3.25)^2 + (6.75)^2}$$

$$(Rise)^2 = 484.4375 \quad Rise = 22.009$$

$$Edge = \sqrt{(23.25)^2 - (6.75)^2} = 22.2486$$

$$Face = \sqrt{(23.25)^2 - (3.25)^2} = 23.0217$$

FIG. 4.



MODEL 1. MAY BE APPLIED TO ANY BLACKBOARD.

List of leg along back of horse, three and one-fourth inches (3¼).
Run of leg, six and three-fourths (6¾).
Determine: Height of saw-horse from floor.
Blade readings for face and edge layouts of legs.
Hint: Derive formula for true length in terms of rise, run, and list of legs.

Score = 30.

MECHANICAL AIDS FOR TEACHING TRADE MATHEMATICS

Herbert D. Harper, Jackson Heights, L. I., N. Y.

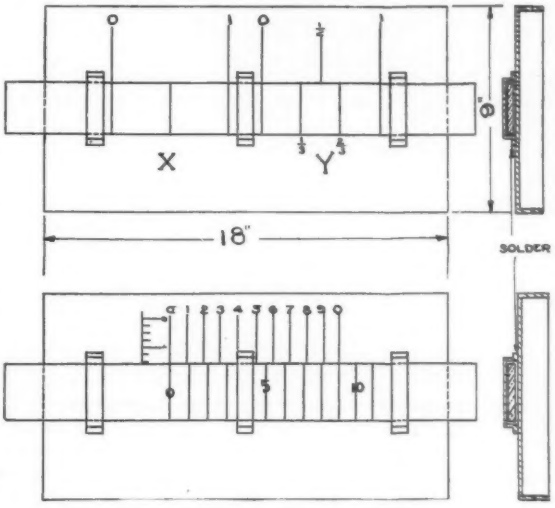
IN the teaching of trade mathematics, it is desirable for a clear understanding of the work, that the student use the instrument or apply to the machine the lesson taught. In some cases, the expense makes this ideal prohibitive and the subject has to be taught without this help. However, this deficiency can be overcome by properly constructed models that will help in giving the student a better understanding of the subject.

One help in teaching the addition and subtraction of the divisions on the steel scale, is made possible by using the sliding doors of a wardrobe in the front of the room. The scale A on the facia represents five inches and each inch is divided into 64 parts. The scale B fastened to the door is exactly the same length which represents one inch on the facia of the wardrobe.

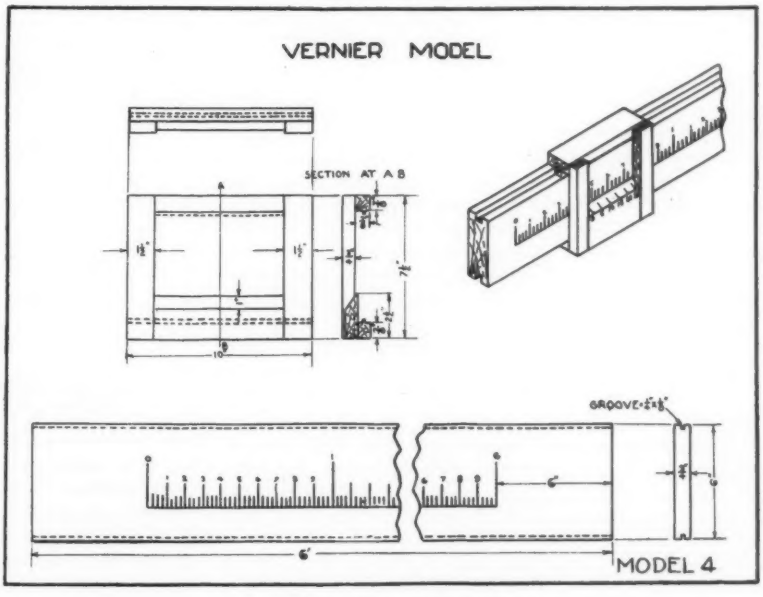
Suppose it is desired to find the sum of $^{15}/_{64}$" and $^{8}/_{64}$". Place the zero on the scale B under $^{15}/_{64}$" on scale A, then the answer $^{23}/_{64}$" is read on scale A over $^{8}/_{64}$" on scale B. Subtraction is the reverse of this operation.

In mental drills this has been found to be very effective, the figures on both scales being of such size as to be visible only to the boy operating the door.

This device can also be used to demonstrate the underlying principles of the slide rule. As usually constructed, the slide rule consists of two parts, one called



ABOVE: MODEL 2. BELOW: MODEL 3.



DETAILS OF VERNIER MODEL.

the rule which is represented by scale A, and the slide which is represented by the scale on the door.

After showing the addition and subtraction of numbers by moving the scale on the door, it is easy to demonstrate the addition and subtraction of logarithms as accomplished by the slide rule.

Figures X and Y in model 2 are used to demonstrate the principle of the vernier. As the movable scale is divided into two parts, it is clear that moving the lower scale one division will divide the distance 0 to 1 in two equal parts.

In Y the upper scale 0 to 1 is divided in half and the lower scale in thirds. If the lower scale is moved either way until ⅓ or ⅔ comes under the end line, it has moved ⅓ of an inch. But if either of these are moved to the center line, then it has only moved one-half of this amount or 1/6.

Model 3 shows the vernier markings on the barrel of a micrometer. In this model the movable scale corresponds to the thimble of the micrometer, each graduation being 1/1000 inch apart. Ten spaces on the barrel equal nine spaces on the thimble, thereby dividing the 1/1000 spaces by ten and giving a reading of 1/10,000 inch.

Both of these models are made from No. 20 gauge sheet iron, the edges being turned as shown by the drawing. The movable scales are made from 1/16" brass ¾" wide.

Model 4 is made of wood, preferably pine. After being painted white, the graduations and figures were painted in black. The graduations correspond to those on an ordinary six-inch vernier caliper, i.e., 25 spaces on the movable scale being equal to 24 on the stationary scale called the beam. The graduations are laid out on a 10 to 1 scale, the actual distance between each graduation being one-fourth inch.

THE LAW OF PROPORTION

C. M. Litteljohn, Seattle, Washington

Students of practical printing may learn as early in the printing course as possible to appreciate the values of balance as well as style. Appreciation of the right proportion and equilibrium in the different point type faces, must be inculcated if the eye for harmony and beauty is to be properly developed.

It is often difficult to make it clear to the pupil that a printing specimen is beautiful and that it possesses the specific qualities which render it attractive to the eye and to that inner consciousness that is touched by a beautiful piece of work. Beauty can scarcely be taught by rote, or through mechanical means.

Unless there can be developed an unconscious appreciation on the part of the pupil to such elements as proportion, and the relation of one type to another, no matter how different in cast, printing may remain with him but utter mechanical copying, valuable perhaps for routine tasks and small job work, but valueless for the higher forms of creative printing. Such a printer will lack that training so essential for larger advertising printing and printed salesmanship, which is so fertile a field at present for demonstrating beauty of typography and disseminating new ideas in printing combinations and color harmony.

Compositors of an older era centered their lines of type in more or less primitive fashion, using the same type face throughout, while younger compositors were taught to square their lines of print. Composition that combines the two as an essential basis and yet allows a flexible, well controlled imagination to set the lines in some new form will embody interesting effects.

Proper proportion in creative work, however, is necessary at all times. Even in the more unique types of printing, designed to catch the eye and attract attention to the content of the message within the printed impression, designed, for instance, to cause an immediate action on the part of a prospective buyer, a balance must be maintained.

This law of proportion may be simply designated as the relationship that exists between the different portions of the entire effect to be created, i. e., a symmetry of line balance, type harmony and spacing, and each balanced within itself. As a basis for beauty in the finished product, the law of proportion must be the foundation upon which the whole composition rests. Further than this the artistic measurements escape detailed analysis.

In this connection, it may be useful to quote a passage from the work of H. H. Brown, on "Applied Drawing", who says: "A very brief statement of a general law of proportion would seem to be almost impossible, yet analysis of a large number of objects, covering many fields and many ages, leads to a conclusion that the approximate ratio of two parts to three is one of wide and useful application. There is the so-called 'Greek Division of Space' which specified 'more than one-half but less than two-thirds'. Again we have the ratio of the 'golden oblong' or the mean and extreme ratio."

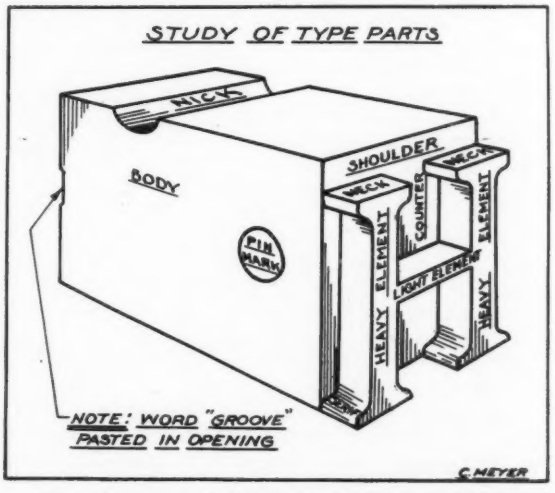
Combined with a proper conception, therefore, of a general law governing proportion, good judgment, as extracted from a well developed appreciation for beauty should be the guide of the young printer in creating such an artistic typographical composition as may be said to contain the refinements of beauty.

A STUDY OF TYPE PARTS

Dean W. Conner and John F. Faber, Erie, Pennsylvania

The accompanying drawing illustrates a method devised and used to aid in the efficient study of type parts.

It consists of a large wooden letter H, having the name of each part typed and pasted in its proper place on the letter. The letter is made about 6" high and the other dimensions in proportion.



The advantage of this method is the curiosity and desire aroused in the new student to inspect and handle the odd representation of a piece of type. This appeal to the boy's interest has indirectly attained the desired end—the ability to associate the typed names with their corresponding part of the letter.

The Santa Maria

Charles H. Dacey, Irvington, N. J.

ONE does not need to be an interior decorator, a collector, or an artist, to appreciate the alluring and decorative character of the little model crafts that are appearing on the modern mantel, and lending their touch of color and romance to the lodge or living room. The increasing popularity of these "Ships That Never Sail", as they have been called, is due mainly to the fact that the ships which they represent are fast disappearing. In their stead we have stout, colorless mountains of steel, motor-driven, upon whose decks cranes and smoke stacks have replaced the graceful wind-bellied sails that dotted the harbors, like their flying companions, the gulls.

Within the last few years, the lure of these models has become more and more sincere, and now the present craze has every prospect of becoming permanent, by the forming in New York City of a Ship Model Society.

It is to be hoped that some day, if this society carries out its purpose, a permanent museum will be established where will be shown the history of the sailing vessel, on the pages of which the American maritime activity and ingenuity will have taken no minor part.

Models of the Viking ships, the Trireme, the Galley, the Carrack, the Galleon, the Caravel, the Man of Wars, the Frigate, will be placed side by side with the greatest and fastest contribution of all, the American Clipper which had no superior in beauty, speed, and purity of line.

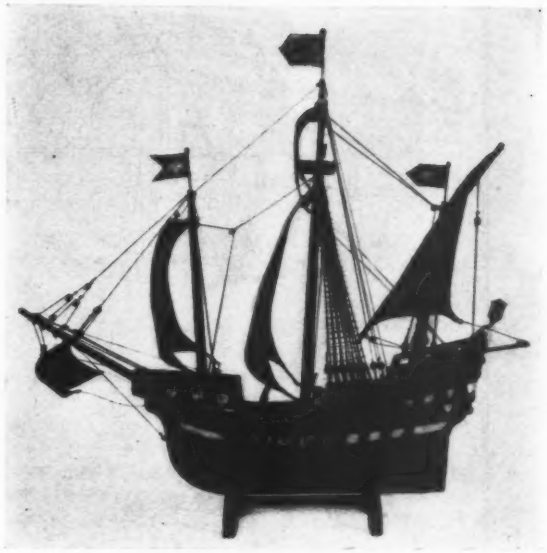
The transition in the design of these ships was a long one, and passed through many stages of development, until their building became in fact, completely revolutionary to the first ideas of construction; from the rounded bodies only twice as long as they were wide, to the long and narrow hull; from the high poop and beak, to the straight deck and boy sprit; from square and lateen sail, to the fore and aft; from the convex bow to the concave; and finally from wood to steel.

Little is known of the early ships and we have to resort to the drawings of imaginative artists of the day to give us the only pictures obtainable. And imaginative they were, inaccurate in line and scale, lacking the fine detail of construction, and the seaman's knowledge of appointment, all of which would assist, by the aid of the model, in restoring their portraits for posterity.

For the same reason, we know little of the actual appearance of Columbus' ship, the Santa Maria, excepting what is written. Columbus' log is luckily still preserved and from that some details of construction and rigging are obtainable.

A few sketches attributed to Columbus are found in Spain and, if the assumption that they were his, is true, then the Santa Maria and the second ship were three masters, but the third had only two, according to E. Kemble Chatterton. The first and second ships have a small square foresail on the foremast, a spritsail on the bow, a square mainsail with topsail, both of which are on this mast, and lateen on the mizzen or rear mast. The third, undoubtedly the Pinta, has lateen or triangular sails on both masts. When under sail, according to the log, bonnets (additional pieces of canvas) were laced on the foot of the mainsail. A bonnet was generally cut one-fourth the size of the mainsail and one-third the size of the foresail.

In 1923 the Spanish government sent a model of the Santa Maria to England to be added to the board of education collection in that country, and in 1893 during the World's Fair at Chicago, she also sent a full-size reproduction to this country which crossed the ocean under its own sails.



THE MODEL AS IT APPEARS ON THE AUTHOR'S LIVING ROOM MANTEL.

It is owing to the careful work and study of Capt. C. E. Terry that these reproductions were possible, as he sifted all data obtainable upon this subject in his efforts to restore a visual picture of the ship of Columbus. And if it is not the ship of the great explorer, it is at least a composite ship, contemporaneous with the age of Columbus, based upon his actual log of the voyage and sketches attributed to him.

The Santa Maria was not the biggest ship of its day, nor the best. She carried a crew of seventy men and was capable of storing artillery and supplies for one year, together with trinkets and merchandise for bartering with natives. Built originally for trading voyages to Flanders, she had a displacement of two hundred tons which, according to modern ideas, would be rather a small vessel for a transatlantic voyage. Simplicity in construction and enrichment was a noticeable characteristic in her design. It will be observed that the only ornament present was that of the devices of church and state which appeared on the flags and sails. However, the model builder in making an ornament of his model can add shields to suit his taste.

The hull of the original ship was constructed roughly of wood with iron nails, which rusted as soon as they came in contact with the salt water. The hull was painted with tar, while below the water line it was greased to reduce friction through the water. However, in creating an ornament, this may be painted in bright colors as will be described later.

To make one of these gems of the sea is fascinating indeed, and instructive also, if one is interested enough to study their history and the transition of their rigging. If one has access to a well-equipped library, he should study the type of craft he intends to build and in that way get a better and clearer idea of the reason for certain characteristics that were useful in their day, but which have given way to the modern scheme of utility.

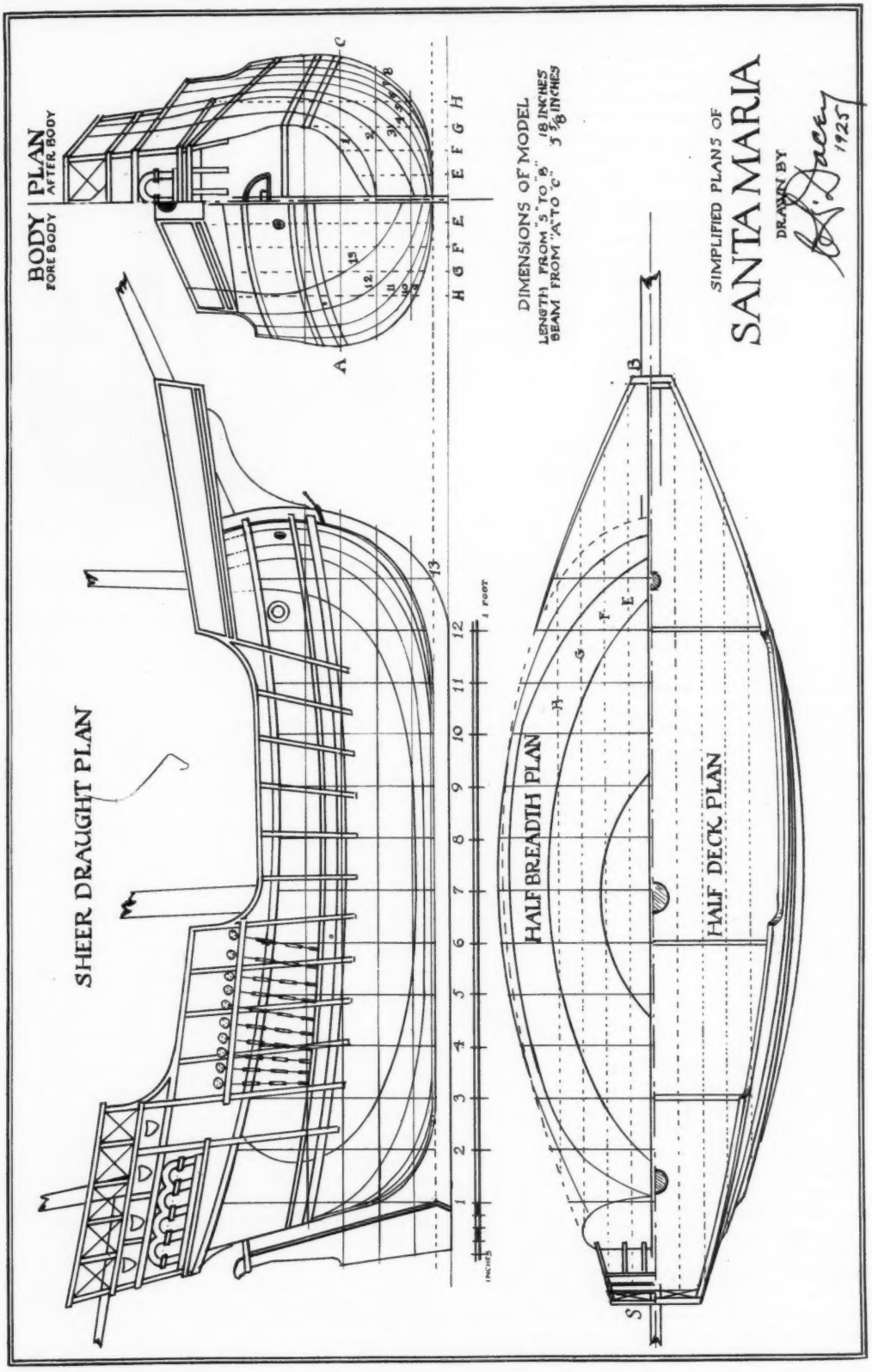


FIG. I. DETAILS OF THE HULL. (FIG. II WILL APPEAR IN THE JULY ISSUE.)

SANTA MARIA

DETAILS OF CONSTRUCTION OF CARDBOARD MODEL

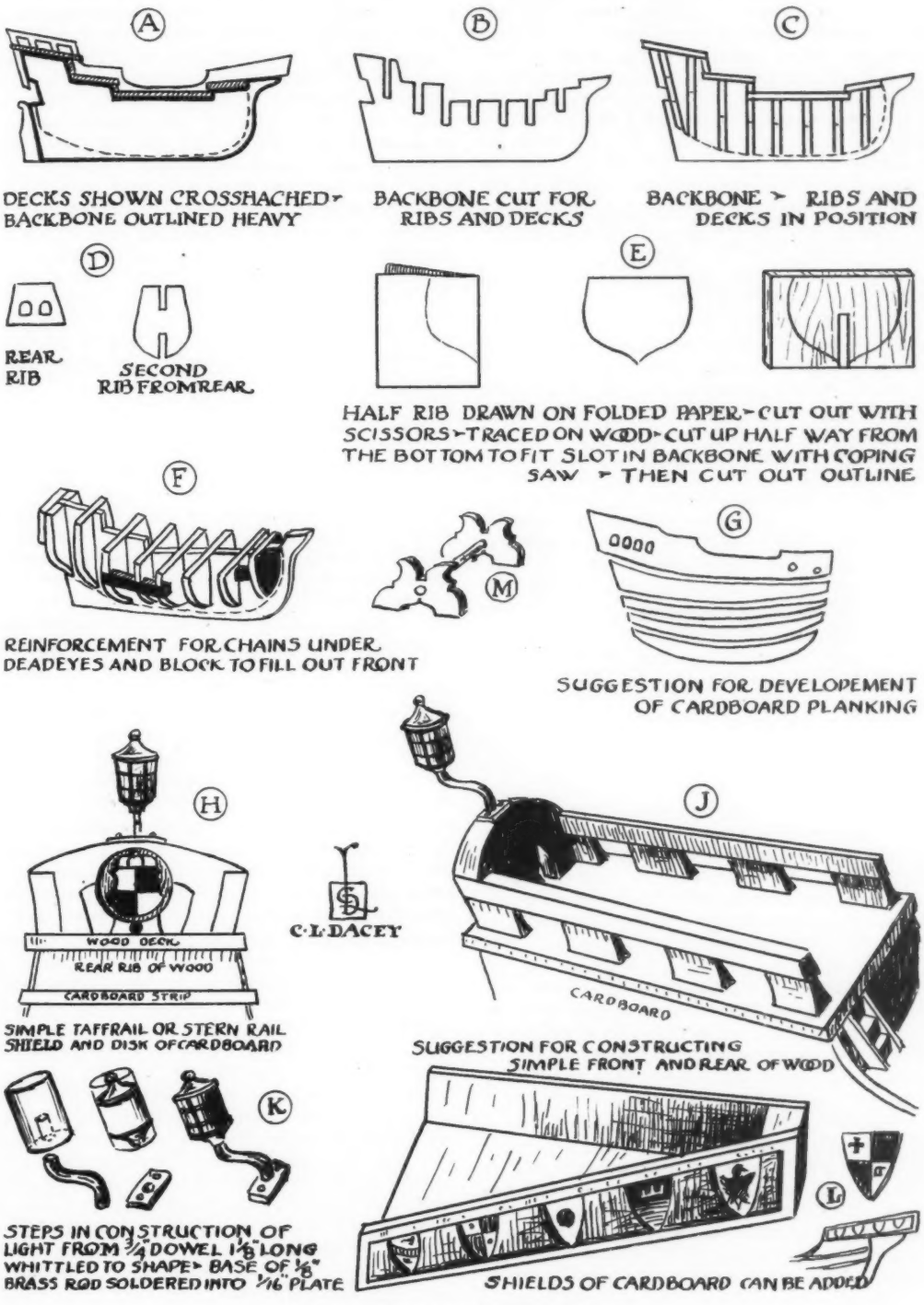

A
B
C
DECKS SHOWN CROSSHACHED ▸ BACKBONE OUTLINED HEAVY
BACKBONE CUT FOR RIBS AND DECKS
BACKBONE ▸ RIBS AND DECKS IN POSITION
D
REAR RIB
SECOND RIB FROM REAR
E
HALF RIB DRAWN ON FOLDED PAPER ▸ CUT OUT WITH SCISSORS ▸ TRACED ON WOOD ▸ CUT UP HALF WAY FROM THE BOTTOM TO FIT SLOT IN BACKBONE WITH COPING SAW ▸ THEN CUT OUT OUTLINE
F
M
G
REINFORCEMENT FOR CHAINS UNDER DEADEYES AND BLOCK TO FILL OUT FRONT
SUGGESTION FOR DEVELOPEMENT OF CARDBOARD PLANKING
H
WOOD DECK
REAR RIB OF WOOD
CARDBOARD STRIP
SIMPLE TAFFRAIL OR STERN RAIL SHIELD AND DISK OF CARDBOARD
C·L·DACEY
J
CARDBOARD
SUGGESTION FOR CONSTRUCTING SIMPLE FRONT AND REAR OF WOOD
K
STEPS IN CONSTRUCTION OF LIGHT FROM 3/4" DOWEL 1 1/8" LONG WHITTLED TO SHAPE ▸ BASE OF 1/8" BRASS ROD SOLDERED INTO 1/16" PLATE
L
SHIELDS OF CARDBOARD CAN BE ADDED

FIG. III. DETAILS OF CONSTRUCTION.

It is not the intention of the author to go into detail concerning this vast subject, as much has been written by men who have given years to the study and preparation of their books. Perhaps the details presented are not wholly correct. They will, however, give the amateur a few short cuts that will help him over the difficult points in construction, which now undoubtedly loom as mountains insurmountable.

In the first place, the model as constructed by the author was fabricated with a wooden frame, not unlike the old canvas canoes and planked with cardboard. The last item will leave a question of doubt as to the sturdiness of the craft. Even though used as an ornament, there is always the hazard of falling which would do injury to a material as fragile as cardboard. Such, however, is not the case as stout illustration board is used, and it is shellaced and painted in such a manner that it not only resembles wood, but presents a very rugged resistance to pressure, and will withstand abuse to which the average ornament is subjected. Do not make the mistake, however, in believing that the hull of this model cannot be made of wood because it can, and will be improved by that method of construction. Wood strips, soaked in boiling water or steamed, can replace the cardboard, or the hull can be made of a solid block using the outside dimension as a guide, much as models of modern yachts are made, only on far different lines.

The Hull of Cardboard

The making of the hull is the first consideration and it is strongly advisable to make a full-size drawing on a large piece of drawing paper, or if none is available, secure a large flat piece of stout wrapping paper at the corner store.

In the accompanying drawing, the vertical lines in the sheer plan (Fig. 1) represent one inch distances. This will make a boat whose hull will be approximately eighteen inches long. The horizontal lines represent eleven-sixteenths. With these fixed points as a standard, a ship of any proportion may be designed to satisfy the desire of the builder. For instance, 1½" vertical lines and 1$\frac{11}{16}$" horizontal would produce a ship about 24 inches long. However, this would be about the limit of a cardboard model. It is not necessary to make the entire drawing as shown, although by drawing all the horizontal and vertical lines in each view it is not difficult to locate where the outlines cross the construction lines. If drawing is understood, this will not be hard, but for the reader who does not understand drawing, a little careful study will enable him to follow the lines and points.

After the drawing of the hull sheer view, trace the outline of the backbone as shown in "A", Fig. 3, the under part including the keel, the front of the bow, the rudder post as they are, but allowing ⅜" under the deck line for the deck plus a small projection in the center for the gunwhale, i. e., the section shown above the decks in "A" between the plow-shaped front and the poop or rear deck.

This backbone outline can now be traced on wood ⅜" thick, white pine preferred, although any other dry straight grained wood will do, and it will look like "A" minus decks, rear rib, gunwhale, and rudder, having the working edge for the bottom. Mark the vertical lines where they come, and cut out the outline with a coping saw.

Now at regular intervals of about two inches, that is, every other vertical line from the rear, ribs will be mounted. The shape of the ribs is shown in the body plan or end view. On the left side, they are shown, counting from front to back—13, 12, 11, 10, 9, and on the right side they are shown, counting from back to front by figures, 1, 2, 3, 4, 5, 6, 7, 8, not counting the extreme rear rib. These, as can be seen by the corresponding numbers in the sheer plan, Fig. 1, also represent the vertical lines. For example, if the boat were cut through the middle at No. 7, the shape of the cross section at this point would be exactly like the shape of No. 7 in the end view, doubled.

Since the vertical lines are one inch apart and the ribs only need to be two inches apart, select numbers 13, 11, 9, 7, 5, 3 and 1, and trace one-half of each of these, and by folding the paper on the center and cutting on the line, two sides of the ribs are cut at once giving a complete rib, Fig. III, "E".

Now trace each of these ribs on a three-eighths inch piece of board, placing the fold of the paper on the center line of the board. Before cutting out the rib of wood, draw a line $\frac{1}{16}$" on each side of the center line, half the length of the rib from the bottom as in Fig. III, "E". Cut out this section first, then cut the outline with a coping saw. Mark each rib with is place number. Ribs 13, 11 and 9 are cut with edges slanting toward the rear; 1, 3 and 5 slant toward the front.

On the backbone of the ship where ribs 13, 11, 9, 7, 5, 3 and 1 vertical lines come, mark and cut a corresponding ⅜" slot as shown in "B", Fig. III, half way down from the top. The lower back piece should now be cut as in drawing Fig. III, "D", clotted above and below to slip in notch above rudder post. The upper back piece is next cut with window openings pierced. This is nailed directly to the end of the backbone, and fits tightly against the lower or slotted back piece. The space between rib No. 13 and the front of the ship is filled by a piece of white pine whittled to shape, allowing for the thickness of the cardboard planking, Fig. III, "F".

The four sections of the deck may now be cut of ⅜" stock according to the front and top views. It is not necessary to curve the poop or rear deck. This deck may overhang $\frac{1}{16}$" on all sides, so that when the cardboard planking is applied, the line of this deck will be emphasized as a distinct line of the boat. In the drawing it is shown very thin, but it can be made of $\frac{1}{16}$" or ⅛" stock. All other decks are to be inside the cardboard planking line, and the planking will be nailed to the ribs and deck, and project ¼" above all decks but the rear and front. It will be flush with the front to allow for the plough-shaped runway.

Estimate where masts, guns, and dead-eye chains are to go and reinforce with blocks of wood glued to each side of the backbone as shown in Fig. III, "F". The reason for this is to provide solid wood to bore and nail into where holes and tacks and nails are needed.

When these items are taken care of according to the drawing, the decks are nailed in place by aligning the center of each deck with the backbone. Risers between decks are now added so that the decks project ⅛" over them. The ship is now ready for the planking. This is accomplished much the same way that the cover is cut for a baseball, one piece fitting into another. Fig. III, "G". Patterns will have to be cut in cheap cardboard and joints should influence the shape of the boat. They should turn up sharply at the front. Each joint is to be covered by a strip of ¼" cardboard and that strip will be one of the lines of the boat.

Cut the patterns so that they will be as few in number as possible below the water line, then treat the rest of the boat above the water line as is shown in the drawing. The upper part of the hull can be of one piece and the rub streaks or guards can be put on later. Tack the cheap patterns in place temporarily, and after experimenting with their shape until satisfaction has been reached, cut the real planks from a good grade of illustration board. These will be then fitted even more closely than the temporary ones.

Shellac the insides of all planks. After they are thoroughly dry, wet the lower plank and nail it to the frame, being sure beforehand that it makes a perfect joint with the keel. Try the next plank. If it fits, wet this also and nail on. Use ⅜" or ½" No. 20 brads or brass escutcheon pins. Nail each section in place. Be sure

that the nails in each case go into the solid wood of the ribs or decks. Nail and glue on strips, and glue on shields also made of cardboard if any are to be used. Make rest or stand for ship of ⅜" stock, using a ⅜" dowel to hold both pieces together. Fig. 3 M.

Next, construct the plough-shaped arrangement on the front of 1/16" or ⅛" stock. If none is available, plane ¼" stock to the required thickness. The raised section on the side may be carved with a ¼" and a ⅛" chisel, or cardboard may be cut to imitate the same effect. The carved method is the easier and more satisfactory. Nail and glue in place, having its center line in the center of the ship. A simple construction is shown in Fig. III, "L".

The railing of the poop deck can be made of quarter-inch stock as is suggested in the drawing "H" and "J", Fig. III, which is more simple than that in the sheer view.

The rudder can be cut and placed in position by nailing fast and imitating the hinges with cardboard, or put on with tiny cleat hinges. It is the same thickness as the backbone.

The shroud anchorage can next be added. It is of quarter-inch stock, beveled on the underside ⅛". It has eight holes bored in it one-half inch apart on the 18" size ship through which the dead-eyes and chains are wired. It should be nailed through to the ribs wherever they come.

The masts and spars are cut according to their dimensions, Fig. 5. Holes are bored for each of these. The main mast slants backward slightly as the shrouds tend to pull it back. The foremast slants forward, and the rear or mizzen mast, slants backward. These angles can be determined by the spar plan, Fig. 2.

The front outrigger, or bow sprit as it is modernly called, passes through the front of the plough-shaped arrangement down through the front deck, deep enough to make it solid. Be sure that all of these masts, etc., are in line with the center line, and perpendicular with the deck laterally. Their angles can be determined by the angle in the drawing, or by the eye, judging the most pleasing position with relation to the lines of the ship.

Each mast and spar have a small hole at the end as shown in the drawing for a rope anchorage. The main and top masts on this ship are of one piece, but the top mast is whittled so that a little platform for the ship's top is made at the point where it meets the main mast.

The ship can now be painted. The author painted and aged the one described here in the following manner: The entire ship was given a coat of very dark, dull brown, made by mixing red and yellow in small quantities with black flat paint, or gloss paint thinned with turpentine if flat paint is not obtainable, about the color of dark walnut stain. This was allowed to dry thoroughly. The band next below the rail of the poop deck was brilliant vermilion red, the section around the windows white and the part outside of the windows containing the shroud anchorage and extending the full length of the ship, was painted a green mixed with yellow, a warm green, the band below white, and the next below painted black, while all underneath was left dark brown. These same colors extended across the back.

The rail of the poop deck and the runway in front were painted gold, including the shields, if there are any, and all window casements red. After the gold dries on the shields, they are painted reds, blues, and whites with crosses and devices of heraldry. A book on heraldry will aid in their selection. If guns are mounted, they should project through square holes in the cardboard and have square porthole doors resting on top of them. The guns should be gold and the inside of the port doors or deadlights should be red.

After everything is thoroughly dry, the whole should be given a coat of walnut oil stain, mixed with rotten stone and a little gray paint. This is put on a little area at a time, and quickly rubbed off from the bright colors, leaving it in the corners as age marks. Care must be used in observing that the age marks are not spotty, but of a grayish brown dust color, and fade gradually from the dark to light. The white should be an old ivory color after this treatment, and the gold should look like tarnished bronze. Nothing should be bright or new looking.

SOME VALUES OF DETAIL DRAWINGS

Anton Anderson, Technical High School, Buffalo, N. Y.

The detail drawing is the universal language of industry. It is one of the greatest helps for rapid material progress which we have. Without it the mechanical world would not be what it is today.

The working drawing is the idea of the engineer or designer, illustrated on paper in such a way that it can be readily interpreted by the workman. It holds the secret of success or failure of the projected object which it represents. It is the silent partner of the architect, of the engineer, of the designer and the maker of mechanical things. It speaks to the workman louder and clearer than any human voice possibly could speak. It fills his heart with a desire to do, to produce, to shape into useful and beautiful articles, materials which are in the inert or rough state. It lifts the worker up on a higher plane of vocational efficiency.

The ability to draw is well worth while to acquire. Every young man entering the secondary schools should be given an opportunity to learn to read and interpret working drawings. Better than that, he should be taught how to make them.

A well made detail working drawing of a piece of furniture consists of three views, interlaced with one another in such a way that their interpretation becomes comparatively easy. The front elevation is customarily drawn in black, the side elevation in blue, and the top view, or ground plan, in red. The use of colors in this manner simplifies the reading and interpretation of the drawing, which is of no small value in intricate layouts. A perspective pencil sketch of the completed article should accompany the working drawing, for it adds much to the quick appreciation of the detail drawing. In teaching the value and interpretation of a detail working drawing of furniture, the vision of a beautifully furnished home is brought nearer realization.

Self-confidence is at once established in the man who has mastered the reading and interpretation of detail working drawing. His vision is broadened, his earning capacity is increased because he is more efficient. His intellect is sharpened and his ability to think and to visualize are marvelously increased; he is able to render a greater service to his fellowmen and to the community at large.

VOCATIONAL ASSOCIATION MEETING

The first annual convention of the American Vocational Association will be held December 2-4, at Louisville, Ky. The association is a union of the National Society for Vocational Education and the Vocational Education Association of the Middle West.

The Association is inaugurating a program of vocational education service which will directly benefit every state in the Union. Another phase of the work is that of assisting states in bringing to state conventions and conferences leaders in special fields of vocational education.

Reports from all parts of the country give assurance that the Louisville meeting will offer an outstanding contribution to the advancement of a nation-wide vocational program.

PROBLEMS & PROJECTS

This department aims to present a wide variety of class and shop projects in the Industrial Arts. Successful problems are invited and will be paid for. A brief description of constructed problems, not exceeding 250 words in length, should be accompanied by a good working drawing. The originals of the problems in drawing and design should be sent.

Problems in benchwork, machine shop practice, turning, pattern-making, sewing, millinery, forging, cooking, jewelry, bookbinding, basketry, pottery, leather work, cement work, foundry work, and other lines of industrial-arts work are desired for consideration.

THE PRIZE CONTEST IN PROJECTS ILLUSTRATING SCIENTIFIC PRINCIPLES

A number of interesting projects in metal and woodwork were received in response to the prize contest announcement in the January and February issues. The first prize was awarded to Mr. H. W. Kroll at Buhl, Minnesota, for his project, "Whirling Planes." The project involves interesting varieties in construction and affords a number of valuable experiences in woodworking. The principle illustrated is useful and important.

The second place was awarded to Mr. J. A. Miller of New Kensington, Pennsylvania, for a "Seconds Pendulum." Mr. Miller's drawings, etc., will appear in an early issue of the INDUSTRIAL-ARTS MAGAZINE.

The third place was won by Mr. Frederick T. Dacey, Agawam, Massachusetts, for a "Color Wheel." The fourth prize was awarded to Mr. Leon A. Orr, Bennington, Vermont, for a "Device for Measuring Stress and Strain in Bending Rods."

Checks have been mailed to the winners.

—The Editors.

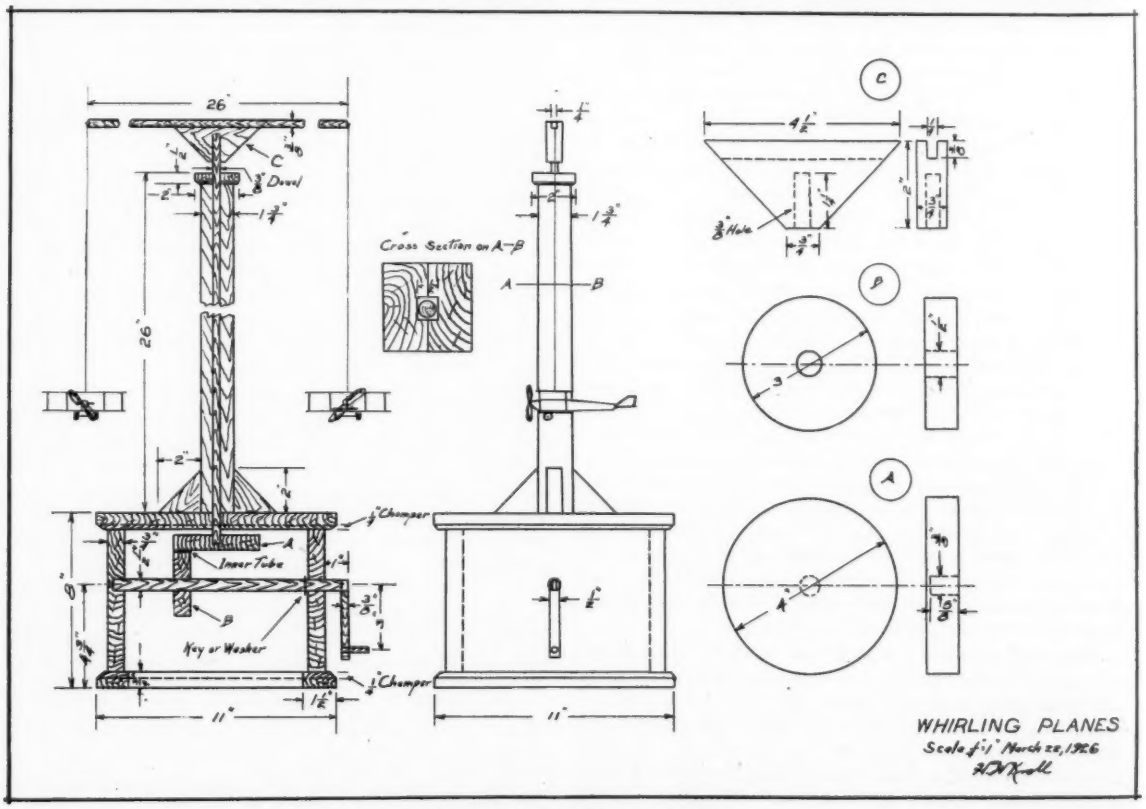
WHIRLING PLANES

H. W. Kroll, Buhl, Minnesota

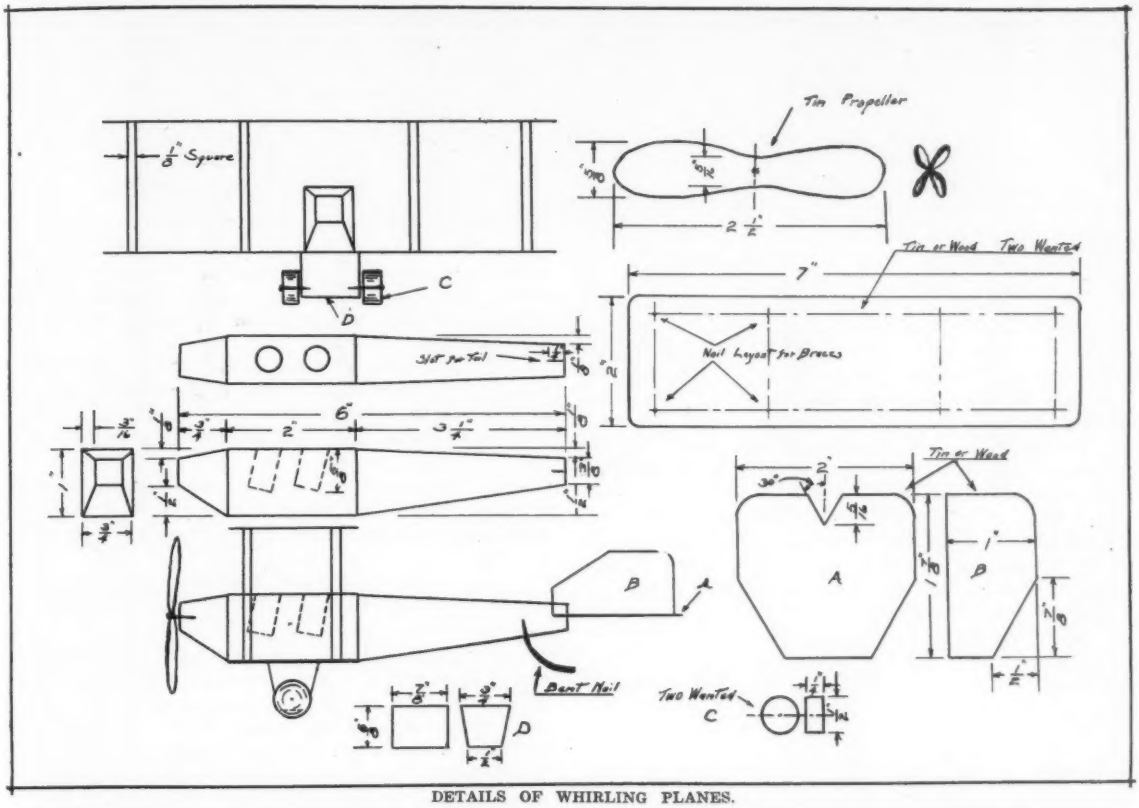
The project, Whirling Planes, may be used to demonstrate several mechanical principles which are of interest to every boy of junior high school age. It also represents a mechanism very attractive, although very simple to construct, giving a variety of work suitable for seventh, eighth, and ninth grade students.

In this problem the instructor will necessarily have to adjust his demonstration of the various mechanical principles to the students at hand. The following principles can be used and each one may be demonstrated more elaborately in the science or physics room in conjunction with the use of the machine. The law of work and force, motion, lever, axle and pulley, centrifugal and centripetal force, gravitation, and the resistance of air to moving objects.

The law of work and force may be demonstrated in the following way: If one sees a hod of brick carried up to the second story, or a heavy barrel rolled up on a skid to a dray, he calls it work. We may not have in mind the same definition of work and the same unit of measuring it. Is the foundation of your school building doing any work when it supports the weight of the walls? What is work? Water stored at the top of the hill will turn the mill wheels as it runs down. We all know from experience, in order to move an object we must give it either a push or pull, which we call force. "Force is a push or pull which tends to produce motion. Work is force acting against a resistance and moving it." In order to move the planes some force must act upon them, and in this project they are so arranged that when the handle is moved, the force is transferred to the planes through the axle, friction pulleys, arms, and strings. The other mechanical principles may be illustrated in a similar manner, but keeping in mind always that the student can much more readily understand your demonstration if one's approach is from the known to the unknown.



DETAILS OF WHIRLING PLANES.



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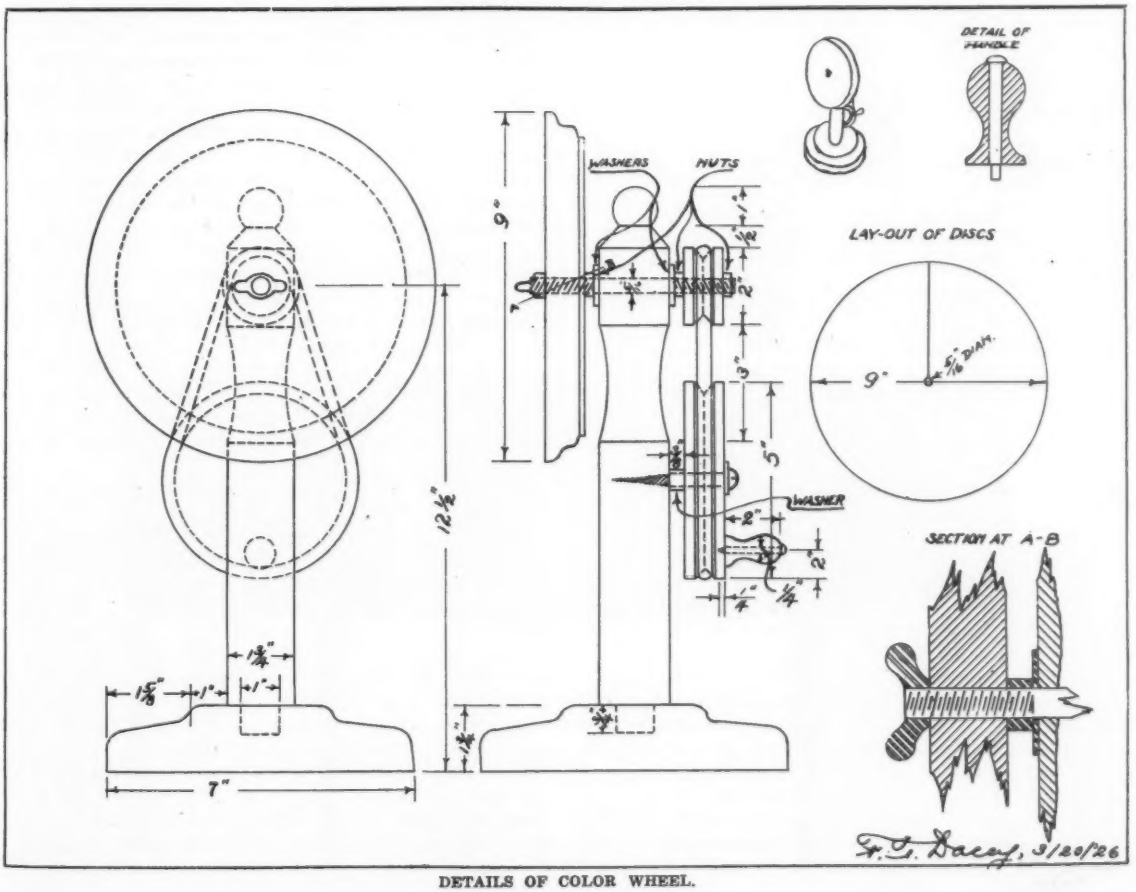


DETAILS OF COLOR WHEEL.

For the construction of this problem the class may be so organized that two students can work together at one piece, or it may be used to demonstrate the factory method of production. The drawing is but a suggestion for the kind of construction used, and may be changed, depending largely upon the amount of material available and the time limit for simple or elaborate construction. Outside of the mechanical principles which it illustrates, there are the methods used in the construction of the box proper. The corners may be made with dado, miter, or butt joints. The upright post shows one method of construction for an opening through a long piece of wood. The wheels give an opportunity for turning on the lathe. The construction of the aeroplane is simple, yet involving processes which are always applicable to woodworking. Tin cans cut and straightened can be used for the material in the wings, propellor, and tail. Here the proper use of the tin snips can also be taught.

In assembling the aeroplane, the support for the wheels is tacked on first to the lower wing, after which the body is tacked on. Here the stakes for the support of the upper wing are tacked in place with brads. The tail pieces may be soldered together and then slipped into the slots cut into the body for that purpose. The tin propellor is bent to the turn of an aeroplane propellor and tacked so it revolves freely.

The process of balancing is probably too difficult for seventh grade boys, but with the assistance of the instructor it can be done very quickly. Tack a piece of adhesive tape on the top wing with a pin secured near the center. By the trial method move the pin until the nose of the plane has a tendency to point upward. This is done in order that the planes may catch the air as they whirl. Make a hole at the point of balance, and knot the string from the arm on the underside of the top wing. On the friction pulley, (A), stretch a band of an inner tube cut about one inch wide.

The entire problem may be painted or stained, depending largely upon the program of the instructor.

COLOR WHEEL

Frederick T. Dacey, Agawam, Mass., High School

The illustrated project is an excellent one for a beginning class in woodturning. It involves only the simplest forms of spindle and face plate turning, incidentally giving the boy an opportunity to draw and form original designs.

It is a medium through which the instructor, by changing sizes and locations of pulleys, can give a concrete explanation of ratios and speeds of pulleys.

A great saving in the cost of laboratory equipment may be effected through the making of these wheels as the commercial article is very expensive.

In presenting this problem, an outline drawing should be the first operation with the class. The better method is taking the drawing step by step on the blackboard as the class are working on it. The bill of stock should now be figured. After this is completed with the group, each boy should fill in the designs he is going to use.

Getting out stock is the next operation. An explanation in regard to extra length, for lathe centers, in stock for spindle turning should be given.

The fundamentals of spindle turning, including setting in lathe, roughing, cutting designs, smoothing, sanding and polishing should now be given. Each operation is a separate lesson, the instructor working as he lectures. Face-plate turning should follow, the steps taken in the same order. Assembling brings the class back to the bench tools again. In this way the interest is kept high.

The threaded spindle presents an opportunity for the use of dies. Blank nuts may be purchased and tapped to explain another metalwork step. A piece of raw-hide or round leather belting such as is used on sewing machines makes the most practical belt. The winged nut on front may be purchased at any hardware store and the color discs of any laboratory supply or the discs may be cut from colored cardboard according to the drawing.

PENCIL POINTER

Wallace E. Grothaus, Wausau, Wisconsin

(See Supplement No. 21)

The pencil pointer solves the problem for saving time in changing the sandpaper or emery-cloth, and also keeps down the expense of buying material. One piece of sandpaper should last a student at least one-quarter of a school year, and if emery-cloth is used it should last again as long.

The operation of changing the pad is very simple. Simply cut a piece of sandpaper or emery-cloth the width of the piece of metal, as shown, and long enough so that about one-quarter of an inch can be turned under at each end.

The metal must be cut about one-thirty-second of an inch shorter than the width of the slot so that when it is pushed into the slot with the paper or cloth over it, it will fit snug.

COIL WINDER

H. D. Campbell, J. Sterling Morton High School, Cicero, Illinois

(See Supplement No. 22)

The usual way to wind coils in a school electrical shop seems to be on tapered forms chucked in a lathe. When a number of boys are making projects requiring coils, much time is lost since each coil temporarily monopolizes the lathe. Another disadvantage is that a multiplicity of forms is required and, unless made of metal, they are soon damaged and destroyed.

The electrical department of the J. Sterling Morton High School requisitioned the writer's shop for drawings of an efficient coil winder. The requirements were: it should be possible to wind coils of any length up to six inches and for cores having cross sections of from 1"x1" to 2"x2"; the form should be removable without its making the coils tapering on the inside; it should be possible to tie the coils so they would hold their shape until they had been dipped and dried; and, clearance of ¼" should be given to allow of topping the coil and core.

The accompanying drawings illustrate the form which resulted from a year's evolution from the original design. It has proven absolutely satisfactory both to make and to use, and there are a dozen in constant operation in the electrical shops.

One consideration of the design will appeal to all who use it, that is, that no difficult operations are involved. The simplest of pattern-making, wood-work, and hand and machine-work in metal are required. Many of the parts come out of stock.

Referring to part number 10, in the drawing, the reader will note that the holes in the casting are numbered. Using holes numbered one makes a form for a core 1"x1"; number two, 1⅛"x1⅛"; number three, 1¼"x1¼"; four, 1⅜"x1⅜"; five, 1½"x1½"; six 1⅝"x1⅝"; seven, 1¾"x1¾"; eight 1⅞"x1⅞", and nine, 2"x2". Obviously, many other combinations are possible in cores not square in cross section. Using two number one and two number nine holes, for example, will produce a coil for a core 1"x2". The four ¼" slats dividing the casting into quarters as far as the hub, are for tie wires or tapes, while another runs the wire on in layers.

A little ingenuity would make this winder semi-automatic so that one boy could use it alone. The count may be recorded by an indicator and it should be driven by an individual motor coupled to the shaft in place of the handle.

FIG. 1. SHERATON SIDEBOARD.

SIDEBOARDS BASED ON PERIOD STYLE PRECEDENTS

Herman Hjorth, New York, N. Y.

(Conclusion)

In the first half of this paper, two sideboards, based on early English precedent, were described. Late Eighteenth Century models served for the following sideboards:

Fig. 3 is a sideboard in the Sheraton style. It is very light and graceful, but not quite as strong as the other types. Its lower middle section is recessed as clearly shown in section AA on the drawing. The legs may be made in two pieces (see Fig. 3) as those in the sideboard just described. The two rounded front corners are made by cutting a square section out of two pieces of wood of the required dimensions so that they will fit over the inside square corners as shown in section AA, Fig. 3. Two pieces of pine or other waste wood are then glued to the pieces instead of the square section cut away. When dry they are turned in the lathe and reeded, after which the pine parts are loosened by steam and the pieces glued in place over the corners. The process of reeding has been treated in previous articles and is fully described in the author's book, "Reproduction of Antique Furniture," pp. 35-37.

This sideboard was made of mahogany and was stained and finished as the Jacobean sideboard.

The sideboard, Fig. 4, is typical of the Hepplewhite style of design and is very similar, although not an exact copy of the original in the American Wing of the Metropolitan Museum of Art in New York.

This sideboard is perhaps more difficult to make because the front is both convex and concave. However, the same method of procedure applies to them all. The front legs must be inlaid before the frame is ready to assemble. All the legs have a wide band of inlay at the tapered end. The lines indicating the position of this inlay cannot be squared around the legs because they are tapered, but must be gauged from their ends with a marking gauge. Sawcuts ⅛" deep are then made with a dovetail saw on the inside of the lines and the recess cut all around with a router plane. The pieces of inlay, cut a little longer than actually necessary, are then glued in place on two opposite sides, clamped with a handscrew and allowed to dry, after which the projecting ends are cut away and the remaining two pieces of inlay—also longer than needed—glued in place. To aid in shaping the convex and concave doors and drawer fronts it is recommended to turn a piece of wood in the lathe and cover its surface with sandpaper. When this cylinder revolves at high speed it will cut a considerable quantity of wood, but it should always be remembered that ridges form and the final finishing must be done with a handscraper

FIG. 2. HEPPLEWHITE SIDEBOARD.

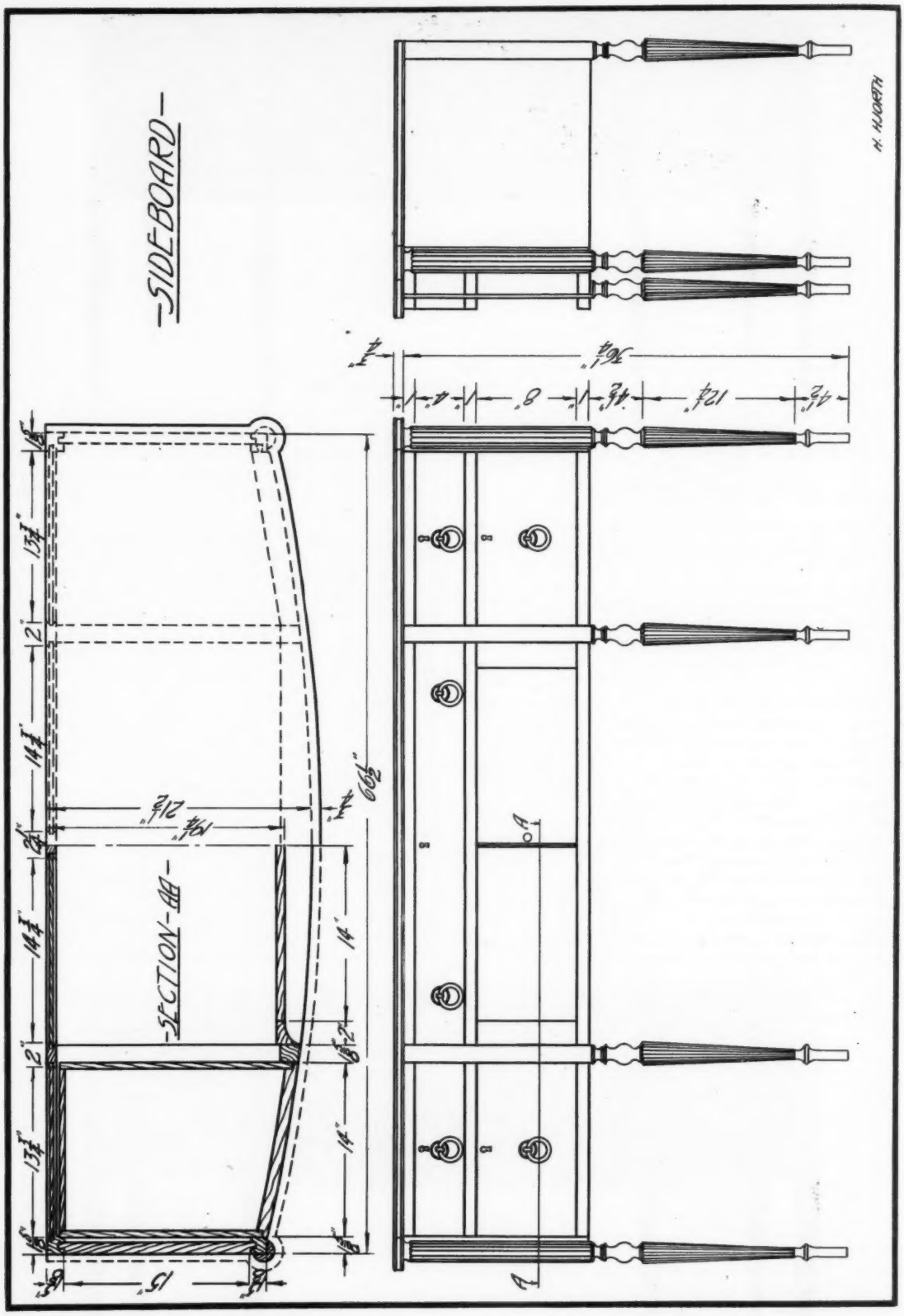


FIG. 3. DETAILS OF SHERATON SIDEBOARD.

and sandpaper. The inlaying of doors and drawers should not be done before they have been fully completed, fitted and scraped to conform to the rails. The two doors are hinged to the two fixed pieces glued to the middle legs and rails with invisible hinges, also called "Soss" hinges. The pieces of inlay in the corners are bought ready made

and inlaid after the satin lines. It should be remembered to glue them in place face down, and that the brown paper on the reverse side will disappear when scraped.

The sideboard was also made of mahogany, but it was stained with lime, which is bought in powdered form and dissolved in water, the quantity depending on the depth of color desired. After the lime has dried the piece looks as if it had been whitewashed. It must now be wiped off with a rag, after which it is given a coat of boiled linseed oil thinned with turpentine to remove the last traces of the lime. After 24 hours the piece can be filled, and after another 24 hours finished with linseed oil in the regular way. Lime was used instead of bicromate of potassium because it does not affect the color of the inlay. It gives a redder, brighter and warmer color, and is on the whole more pleasing than the color of bicromate.

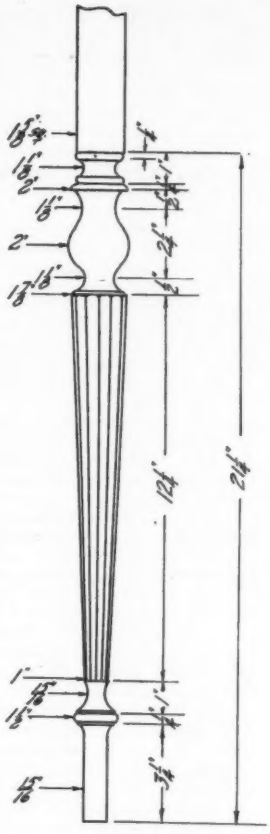


FIG. 3A.

Note: Those four sideboards were made in the Baldorioty de Castro Technical School in San Juan, Porto Rico, under the direction of the author.

DECORATIVE DESIGNS

Charles A. Richert and Otis Philbrick,
Cambridge, Mass.

The accompanying plates illustrate the use of fish and details of fish as motifs for wood carving, stenciling, and other decorative work which can be undertaken in high school art and manual training classes. The designs in both sheets, one and two, can be used in preparing the decorations for a school paper, for the menu cards of a school cafeteria, and for numerous other purposes. Figure 1 is reproduced in full size for convenience in copying.

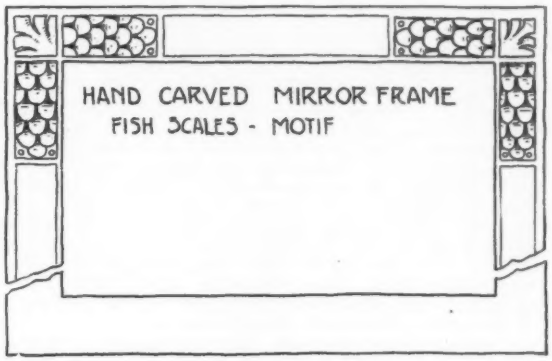


FIG. 3. A FISH MOTIF APPLIED TO A CARVED PICTURE FRAME.

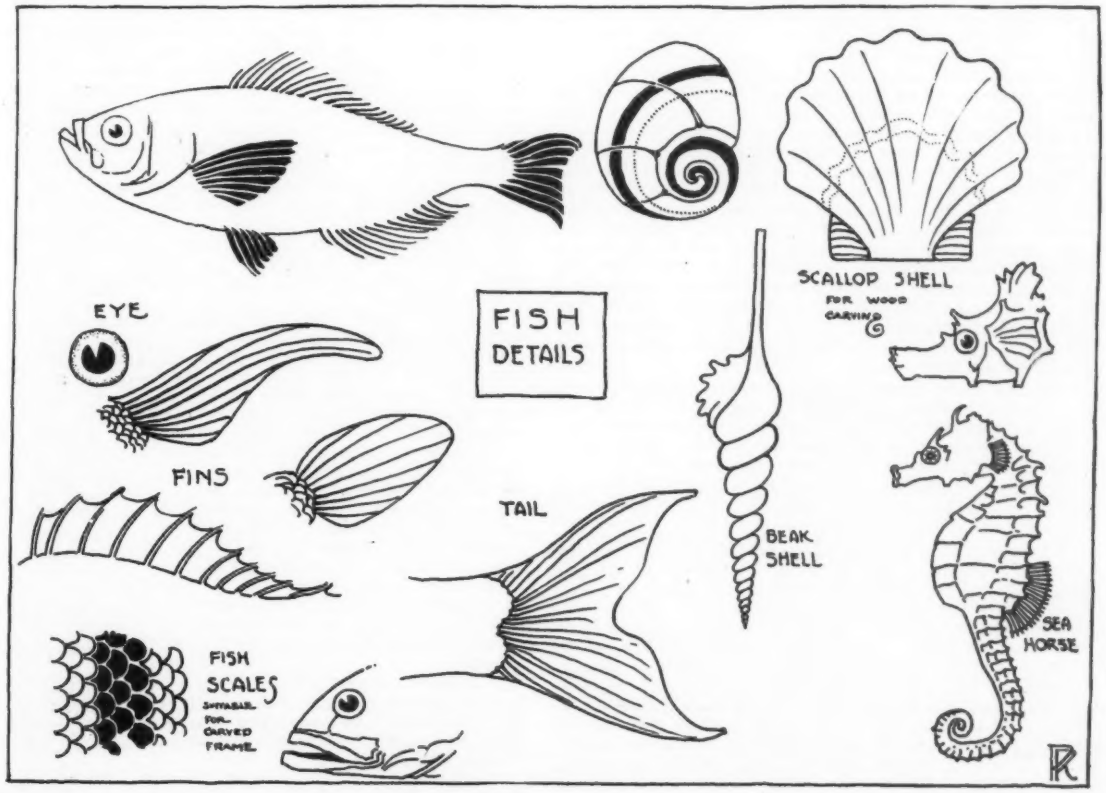


FIG. 2. ORNAMENTAL FISH.

VOCATIONAL EDUCATION SOCIETY OF BOSTON

The Vocational Education Society of Boston held its regular monthly meeting and luncheon April 10, at the Hotel Westminster in Copley Square. A novel type of program was given. The talks were in answer to questions which had been handed to the secretary, and dealt with topics of general interest to the membership. All three speakers are members of the Society.

Mr. Harry L. Jones, director of manual training and vocational education of the Somerville schools, gave an interesting talk on "Grading Shop Instructors." Mr. Jones stated that he himself has abandoned the method of "putting down a mark" for a teacher whom he has visited. He has found such marks far from satisfactory. The good qualities of one teacher may be totally different from those of another; likewise the bad qualities. It is hard to grade human beings; and teachers themselves realize this through their attempts to grade their own pupils. The high degree of interest in the past few years in the use of measurements and tests of various sorts, shows this. Mr. Jones is convinced that in a few years it will be the accepted procedure to grade pupils according to ability by means of tests. Teachers, too, will be more accurately graded and rated according to ability, than is now possible.

The answer to the question, "Does a teacher know his business?" involves answering the further question, "Is the curriculum right?" A teacher cannot be blamed for poor results if the aim of the school and of the course is not definite, or is differently interpreted by the teacher and the supervisor who marks him. We are not past the need of defining aims. In the straight vocational school the aim is sufficiently definite. This is not always true of shop courses in the high school and the junior high school. It is because of this clearly-defined aim of the vocational system that men picked from industry seem equally able, as teachers, with those who have a great deal of theoretical normal-school training.

A supervisor, said Mr. Jones, does not need to be acquainted with the trade or technical subject-matter being taught, in order to estimate a shop teacher's ability. Without such knowledge, he can see what is lacking, in what respects the exercise falls short of being a well-conducted lesson. As a matter of fact, he is usually safe in assuming that the shop teacher is a master of his subject. It is as a teacher, not as a craftsman, that the supervisor attempts to rate him.

A composite answer from a large number of industrial employers, when questioned as to what they desired the schools to give to their future employees, listed such qualities as industry, enthusiasm, courtesy, initiative, self-reliance. Though these are intangible things, the school cannot escape the responsibility of inculcating them, said Mr. Jones. In fact, if a shop teacher is truly efficient, he will impart these qualities to his pupils along with the specific trade knowledge and skill which constitute the more obvious goal of his course. Success in developing these qualities, which seem personal and social rather than vocational, is one of the most potent things in raising a shop teacher out of mediocrity, or of raising a good teacher to the level of greatness. This is one of the chief matters with which supervisors deal in forming an opinion as to a teacher's ability.

Certain more formal "rating points" commonly used by supervisors were explained by Mr. Jones under the headings: personal equipment, ability to secure pupil participation, attention to physical details, discipline, cooperation, professional growth, and social efficiency.

Mr. Jones gave the teachers their "innings" by suggesting a similar list of factors by which they could measure up their supervisors.

In emphasizing the danger which besets both supervisor and teacher in their attempts to rate their charges, through personal prepossessions or unconscious subjectivity, Mr. Jones displayed and explained some charts showing various ratings given to a class of pupils in mechanical drawing. A group of eight teachers of the subject, using their customary methods of marking, showed vast differences in rating the same papers. These same teachers, after a careful study of the whole question of rating, on what it ought to be based in their subject, and how it should be applied, later came to a substantial agreement. They did this by defining the aim of the drawing course, and then taking the pupils' drawings, not their own conceptions of an ideal drawing, as the standard.

Mr. Ralph W. Babb, vice-president of the Society, and director of the Lynn Continuation School, next spoke on "Aims of Junior High School Shops."

The junior high school is a fixture; but its aims are not yet fixed and agreed on a national or even a statewide basis. Its problems are almost local in their diversity. In the solution of these problems, teachers are not only interested but responsible.

The junior high school, roughly speaking, was established for the purposes of holding more pupils in school; of recognizing the fact of adolescence; and of giving, through a richer curriculum, an opportunity for self-discovery. Boil these down, and the single word, Guidance, looms as a large factor of the school.

Although junior high schools, either properly or inaccurately so-called, differ vastly in many ways, they practically always include shop-work. The two broadly differing conceptions of this shop-work are as prevocational or try-out work, and as straight manual training.

Prevocational work offers to the pupil opportunity for self-discovery through exploration, and for choice. There are four general ways of organizing prevocational work, as follows:

The Ettinger plan, by which each pupil is routed through a number of specialized shops, spending a few weeks in each.

The Teachers' College plan, which gives a variety of experiences in a single general shop.

The Gary plan, in which pupils observe and assist journeymen in each of several specialized trade shops.

The Pittsburgh plan, which puts the pupil in the seventh grade into a general shop, and eighth grade pupils into a number of specialized shops from which they make selection of a "major" shop for the ninth grade work, is the fourth plan. All real prevocational work follows broadly the outlines of one or more of these plans.

In many junior high schools, however, the shop work is frankly on a "practical arts" or manual training, instead of a prevocational basis. Studies by Professor Thorndyke and others give good support to the arguments in favor of this type of training.

It is the definite task of each school, however, to arrive at a clear conception of the aims of its own shop work. The teachers themselves, as well as the supervisors, must be looked to in each locality to formulate such a definition.

Mr. William E. Wall of the Boston Evening Trade School took for the third part of the program the subject, "Wood Finishes and Finishing." From a wealth of experience in the trade, Mr. Wall laid down many valuable directions. A great deal of fine work turned out in school shops is ruined in the finishing, Mr. Wall declared. He spoke of the characteristics of various woods, and their different degrees of porousness. He discussed fillers from the standpoint of the needs of these various woods. Mr. Wall advocated the use of fillers as near as possible to the color of the wood. The natural beauty of any wood that is fit to use, he declared, is worthy of preservation. Stains and imitations are a snare and a delusion. The present "fad" for artificially dark tones in mahogany is a thing to be deprecated.

In varnishing, Mr. Wall urged the use of no more coats than are absolutely necessary. He referred to the principles of contraction and expansion as they affect varnish, and to the fact that different coatings are never perfectly consolidated with one another. A single coat of varnish will seldom crack, he said. Three coats are very likely to; and four coats always crack. Furthermore, it is twice as costly to remove varnish as it is to apply it.

Mr. Wall spoke of the chemical and physical effects of various fillers and finishes in combination with each other. Shellac, based on alcohol, and varnish, which is an oil solution, create complications when used together.

The many questions which were asked from the floor and answered by Mr. Wall indicated the degree of interest which his subject had for teachers of woodwork.

A guest of the meeting was Professor Jeremiah F. O'Neil of Massachusetts Institute of Technology. Mr. O'Neil's many friends in the Society gave him a warm welcome.

President Baker called attention to the fact that next month's meeting is the annual business meeting and election of officers. He announced as a nominating committee Mr. Clark of Hyde Park, Mr. McAlpin of Everett, and Mr. Tucker of Lynn.

Announcement was made of a trip, May 8, to the Shirley Industrial School.

APRIL MEETING OF THE NEW YORK SCHOOL CRAFTS CLUB

The regular April meeting of the School Crafts Club was held on Saturday evening, April 17, at Geneva Restaurant in New York City. A well-rounded program was presented. Following four speakers, one club member exhibited some metal-work projects. President Charles H. Kennington announced that the club will have a big time at the May banquet. Firms are furnishing some worth-while souvenirs, including among others some five dollar pens.

Mr. Thomas H. McHugh, principal of the Boys' Continuation School, Newark, N. J., talked upon the "Organization of a Boys' Continuation School." This type of education is often greatly misunderstood by laymen. It is logical for them to think that the children *continue* the studies of the grammar school. This cannot be done in six hours per week. In Newark, one-half of the time (half a day) is devoted to shopwork. The aims differ from full-time school work, for the guidance feature is uppermost.

The continuation school has something to contribute to education. Every year two thousand boys drop out from full-time schools in Newark, because there is not sufficient appeal to overcome the power to earn money. Therefore, to get a hold on this type of boy a strong appeal is made on his interest. In the first place he is given a chance to select the type of handwork he is to do. Then again a different kind of discipline is expected, not the stiff formal type, but an orderly, interested, and busy kind which allows considerable freedom from formality. The teachers try to open up to the children a vision of the industries of Newark and elsewhere, and a direct attempt is made to teach according to individual needs.

A talk on "A Unit Plan of Organized Diversified Activities in Industrial and Practical Arts" was given by Mr. Harold Feuerstein, supervisor of industrial arts at Princeton, N. J. Mr. Feuerstein illustrated by charts the points he wished to emphasize. The aims outlined for the work at Princeton are: (1) how to work systematically, (2) appreciation of industrial work, (3) insight into and possibilities of industrial work, (4) a general understanding of activities studied, and (5) practical application of work studied. A pupil selects an activity and studies this by means of lesson sheets and references for a unit. Then he may continue in this study or change to another activity. Mr. Feuerstein has mimeographed a 43-page pamphlet dealing with this course of diversified work. The classes are organized with an elected class foreman and a division foreman. Assistance is given by posted projects, test boards, weekly bulletins, honor roll, display cases, contests, and plays in school assembly. The success of this plan depends on a thorough organization of subject-matter and classes.

"Professional Spirit Among Shop Teachers" was discussed by Mr. Merritt W. Haynes, of the Educational Department, American Type Founders Association, Jersey City, N. J. Mr. Haynes has been impressed by the rapid growth in education in relation to the construction of fine school buildings all over the United States. School Crafts Club members denote that they have professional spirit by their attendance at club meetings. The late James Parton Haney established the club in order that the shop teachers might exchange ideas through demonstrations of projects and thus mutually help each other.

What constitutes a profession? Many teachers are tradesmen who were promoted to teaching. A profession, said Mr. Haynes, is an occupation which requires one's entire interest, is entered by choice, requires a long period of preparation, is characterized by unselfish service to humanity, sets up standards of service and ability, requires high ability, and is made up of members which share mutually developments and achievements. As an organization, members of the School Crafts Club give unselfishly to each other. There is satisfaction and compensation in teaching other than pecuniary acquirements. Benjamin Franklin chose to be known as a printer, despite his scientific achievements. Here is the inspiration which one teacher upon his deathbed handed down to others: "I have been living, laboring, loving and all is well."

Mr. Samuel Tanenbaum, shop instructor in public schools, New York City, brought an exhibition of reed work and basketry to illustrate what can be done by grade boys.

Mr. John Dockstader, instructor of metal work at Perth Amboy, N. J., brought with him a completed iron bridge lamp and a variety of knives which had been made in his classes.—**Lloyd F. Stair.**

W. CARSON RYAN,
Swarthmore, Pa.,
President-Elect, National Vocational Guidance Association.

The National Vocational Guidance Association is extremely fortunate in having as its president for 1926-27 Dr. W. Carson Ryan, Professor of Education at Swarthmore College. Dr. Ryan was one of the earliest serious students of vocational guidance and rendered pioneer service in promoting it by his writings and advocacy of the work. He has been at various times professor in the University of Wisconsin, editor of the United States Bureau of Education, and associate editor of "School and Society."

MR. VAUGHN TO DENVER

Mr. Samuel J. Vaughn of Mexico, Mo., has accepted the presidency of the Colorado Women's College at Denver.

Mr. Vaughn, who is a graduate of Drury College, has been for the last five years president of Hardin College for Young Women at Mexico, Mo. He is a native of southwest Missouri, where he began his educational career as a student and later as a teacher. He served as superintendent of schools at Fair Play, Humansville, and Walnut Grove, Mo., and was for two years connected with the schools of Springfield, Mo. For ten years he was head of the industrial teacher training department of the Northern Illinois Normal School, and later was head of the department of industrial education of the University of Illinois.

Mr. Vaughn is the author of textbooks on vocational education and is an editor of the INDUSTRIAL-ARTS MAGAZINE. He has contributed articles on educational subjects to many of the leading educational magazines and has served as president of the two national organizations of art and vocational education teachers.

DEATH OF PROFESSOR USRY

Eldon L. Usry, head of the department of industrial education at Ohio State University, died at New York City following several days' illness of pneumonia. He was attending Columbia University preparatory to receiving the doctor of philosophy degree.

Professor Usry was born in Iowa, receiving his preparatory education there, and in 1904 graduated from Iowa State College, receiving a bachelor of mechanical engineering degree. From 1904 to 1906 he taught in the West High School at Des Moines, and for the next four years was director of manual training in the Bloomington, Ill., high school. He assumed a similar position at Highland Park, Ill., and remained there a year.

In 1912 Professor Usry received the master of arts degree from Columbia University and became an instructor at Teachers College during the summer of that year. After serving a year he went to Interlaken School as instructor of manual training.

Professor Usry came to Ohio State University in 1913 as assistant professor in manual training. In 1916 he was advanced to professor of manual training, and in 1918 to chairman of the department of industrial education. He had served on the faculty of Ohio University for thirteen years and was active in Y. M. C. A. work.

Surviving Professor Usry is his widow, who was with him during his illness and death.

NOW, ARE THERE ANY QUESTIONS?

Staining and Matching Walnut Veneer

Q. 600. I am enclosing two samples of walnut veneer. Is there any stain or application by which the white can be made to match the dark? The color must penetrate the wood.—R. M. F.

A. There is no reason why the sap and heart cuts of walnut veneer cannot be successfully stained to match. As a matter of fact, if care is used to keep the sheets in their proper numerical order as they left the veneer knife, beautiful matching results are frequently secured, especially in wide panel and top work. In this case, the white part is only partially darkened by staining, thereby producing a type of high lighting or two-tone color effect which is considered quite desirable. Further deeper effects can be secured by double staining the white portions and when not quite dry restaining the whole panel with half or quarter strength stain. Water stain is much to be preferred to any other for this class of work as it is almost impossible for even a skilled blender to successfully cut in sap work with spirit or oil soluble stains. Further blending effects can be secured by tinting orange shellac with alcohol soluble Bismarck brown for red tones and alcohol soluble nigrosine to shade the red to brown with black. This should be applied with a soft fitch or bear brush in not more than a one and a half pound cut, that is, each volume of four pound shellac should be reduced with at least three volumes of denatured alcohol.—**Ralph G. Waring.**

The Use of Shellac and Aluminum in Veneering

Q. 605. In our cabinetmaking department, we do considerable veneering, such as doors, desk and table tops. These range in size from one foot square to 3'x5'. In our veneer press at present we have only large flat wooden cauls. If it is practicable, I would like to buy sheet aluminum for this purpose and have not had sufficient experience to know whether or not metal of $\frac{1}{16}$" thickness would be satisfactory for this purpose. Can you help me?

Some manufacturers recommend the use of a thin coat of shellac between stain and filler, and others between filler and varnish. Is not the coat of shellac between the stain and filler to prevent the muddy look that sometimes is caused by mixing of these two? What is the real reason for shellac between filler and varnish, and when do you recommend its use, and when is it not necessary?—E. D. M.

A. It is my opinion that you will find the use of $\frac{1}{16}$" aluminum very expensive. The veneer industries get around this problem through the use of $\frac{1}{16}$" three-ply veneers faced with maple or birch and sized with a dilute solution of casein glue. After the latter has hardened, it becomes insoluble and seldom receives any other treatment. If you find that the work may sometimes stick to these cauls, it is my suggestion that they be wiped off with a cloth containing a minimum amount of paraffine oil, merely sufficient to very slightly grease the face; after which they should be stuck and piled to dry before using on the next batch. After about the second oiling, these cauls will need no further treatment. I find that the majority of case goods and desk plants on my lists have discarded metal cauls, and that where these are still used, that they are zinc.. You will appreciate that this entails a very considerable saving in overhead, as well as the fact that these same cauls can be resized to smaller dimensions in case of breakage; a method not possible with metal cauls.

Shellac should be used at the rate of 1½ lbs., per gallon of denatured alcohol in order that it may size the stain and when dry, allow for sanding and cutting down of the fibres without showing gray. This permits the filler to be applied and wiped off clean without producing any cloudiness in the stain coat. This is especially noticeable in the case of water stain mahogany in which case the omission of the dilute orange shellac would allow the wood to absorb the oil in the filler; materially affecting the shade as well as producing a muddy finish. Where shellac is omitted following an oil or spirit soluble stain, the latter is quite often lifted entirely when the filler is applied and subsequently cleaned off.

The use of shellac, generally in two-pound cut solutions over a filler, is made necessary in order to complete the sealing of the filled pores and prevent the absorption of the varnish coat when the turpentine of the latter partially softens the filler in the pores, thereby giving rise to the condition known as pin holing or sinking. Where the filler has been dried for 48 hours, this condition seldom occurs and in the case of high grade desk tops, finished in three or more coats and rubbed for finish, a tougher and more adhesive coat will be produced than when the finish is applied over shellac from which the varnish is more likely to chip when the edge of the desk is bumped with a chair, for instance. In case it is necessary to force the work on a time schedule, the filler may be kiln dried for six and a half hours at 120° F., cooled for one-half hour and coated with a two-pound cut of shellac; dried for one hour and sanded with a split 6-0 paper; after which the varnish may be applied and the first coat will show up full and plump.—**R. G. Waring.**

Pyroxilin Cement

Q. 608. Can you tell me what to use to glue or paste two pieces of imitation French ivory together?—A. W. M.

A. French ivory, pyroxilin, and other similar materials can be cemented with several types of cements.

Amyl acetate and alcohol (denatured) in equal quantities make an excellent cement. Chips of the "ivory" may be dissolved in amyl acetate to make a thick, strong cement.

The oldest type of cement is made of three parts of alcohol and four parts of ether. Another cement is made of one part of camphor dissolved in four parts of alcohol. To this is added an equal amount by weight of shellac.

All the mixtures described must be kept away from open flames, and all are poisonous.

A SUGGESTION OF VALUE

To the Editor:

How may we as teachers of manual training, improve our job of helping boys to discover vocational leads, and in aiding them to choose a vocation?

Several years ago, one of the boys in a well equipped shop found his greatest interest in the "junk pile". From an assortment of nails, wire, sheet metal, bits of lead and a few brass shells, he made a small steam engine, which when connected to a steam radiator, would run. A small tin circular saw was added and a big business was established in cutting up tooth picks and matches into "stove wood". The inventor is now a successful mechanical engineer.

A few dry cells, some copper wire, and a toy motor so interested a lazy and diffident youth that he fairly "ate up" electricity, shook off his lazy habits, and today is the head of a large electrical plant.

Some bits of rope, and marlin, stories of sailing voyages to the lands where hemp and sisal grow, a desire to make knots and splices, as did the sailors on these voyages, started a slow youth on a trip to the bridge of an ocean-going steamer. He has a right to be there for he holds a master's ticket good on any ship in any water.

A crippled youth interested in making a new design for his book-ends found much pleasure in the work and is now making good as a designer of memorial windows.

A study of cement and the making of a bird bath was a stepping-stone to a successful business as a concrete designer and this for a youth who could not see any sense in making a form for that thing.

I could go on indefinitely with such instances, but I am desirous of your opinion upon this matter: Should our shops be equipped with an educational "junk pile", or a unique museum out of which the diffident youth may find something in which he is interested, vague and uncertain with half-formed ideas today, vital and throbbing with awakened interest in the tomorrow which is his?

Yours truly

A. L. DIX.

Melrose, Mass.

NO BREAKAGE HERE

TAKE a good look at this cross-section of a Stanley Everlasting Chisel. Note particularly how a blow on the head is transmitted directly to the cutting edge.

This tool is ideally fitted to withstand the abuse met with in school shops. Due to its construction the handle will not break. It is more economical and will give longer and more efficient service.

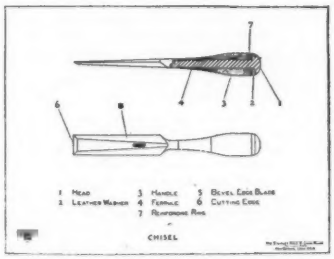
Stanley Chisels are made with bevel or square edges and are ground sharp at the factory. Great care is used in heat-treating the blades and they represent the height of craftsmanship in tool construction.

The Stanley Catalogue No. 34 should be in the hands of every Manual Arts or Vocational Supervisor or Instructor. It lists and shows pictures of over 1500 items, as well as detailed drawings of their construction and adjustment.

In addition, the appendix gives a number of tables covering subjects pertinent to woodworking.

You should have a copy of Catalogue No. 34, by all means. Send for your copy today.

THE STANLEY RULE AND LEVEL PLANT
Educational Department, New Britain, Conn.



THIS CHART WAS MADE TO HELP THE BUSY INSTRUCTOR

The use of the above chart will save considerable time and aid materially in instructing the pupil in the construction and nomenclature of the tool. This chart and others on the plane, screw driver, common joints, hammer, try square, etc., are free for classroom display. Send for them today if you have not been supplied.

STANLEY
S.W.

STANLEY TOOLS

STANLEY EQUIPMENT IS STANDARD EQUIPMENT

Good Schools Deserve "Yankee" Tools

"Yankee" Plain Screw-drivers Even Stand Abuse

One thing is just as true of screw-drivers in a school as in practical use—sooner or later they have to stand being used for almost every purpose from a chisel to a crowbar.

A "Yankee" Plain Screw-driver is made overstrong. It will stand just such abuse.

A "Yankee" device (found in no other screw-driver) makes blade and handle practically a one-piece tool.

A "Yankee" Driver will stand being driven right through a plank. Used as a chisel it will cut off a strip of steel. Neither operation will result in a split or loose handle, or chipped blade.

Every individual blade is tested twice before leaving factory—another reason why a "Yankee" Driver lasts longer in any kind of service.

No. 90—Standard style, 15 sizes, 1½ to 30 in. blades.

No. 95—Cabinet style, 11 sizes, 2½ to 15½ in blades.

Some other "Yankee" Tools

Ratchet Screw-drivers	Automatic Feed Bench Drills
Ratchet Bit Braces	Ratchet Tap Wrenches
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"Yankee" on the tool you buy means the utmost in quality, efficiency and durability.

Tool Book Free — Tells all about the famous "Yankee" Tools.

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NORTH BROS. MFG. CO., Philadelphia, U. S. A.

"YANKEE" TOOLS

Make Better Mechanics

NEWS AND NOTES

Vocational Education Conference. The agriculture, trade and home economics teachers of Nevada will hold their annual conference August 18th to 28th, at Glenbrook. Mr. Paul W. Chapman, director of vocational education in Georgia, will lead the agricultural instructors in their group, while the home economics conference will be led by Mary S. Lyle.

Evening Work in Home Making. Miss Eleanor Mollart of Battle Mountain, Nev., recently conducted a successful evening class in clothing. The work included remodeling, tailoring, and elementary sewing.

Mrs. A. E. Darley, formerly home making instructor at Bunkerville, conducted adult classes at Bunkerville and Mesquite. The work included the construction and care of children's clothing and dressmaking.

Museum of Art. The Museum of Art at Baltimore, Md., has outgrown its present location and steps have been taken to provide an adequate building. The new Museum will be erected from a million-dollar-fund, provided by popular vote at the 1924 election. The site is in one of the beautiful residential sections, contains six acres of ground, and is located near wooded groves offering possibilities for fine landscaping effects.

Vocational Guidance Introduced. During the senior year, an interview in the guidance office is given to each prospective graduate of the Penn High School for Girls, Philadelphia, Pa. The interviews are part of a practical system of vocational guidance which includes supervision by student advisors from the day a girl enters the school. A special committee keeps in touch with students aspiring to college or normal school and they are under careful observation throughout the school course. Frequently scholarship or part-time employment is arranged for those who need financial assistance.

Establish Girls' Trade School. The board of education at Cleveland, O., has voted to establish a girls' trade school in one of the elementary schools.

Approve Trade Courses. The school board of Boston has approved the establishment of an evening trade course in plumbing and a part-time course for apprentices in the machine trade.

Few Boys Follow Calling of Fathers. To determine the vocational choices of boys in the ninth grade of the University of Oregon high school, a study was recently made of the occupations of the fathers of these boys and whether they desired to follow the same line of work.

Of the 203 boys tested, 177, or 82.2 per cent, had already reached some conclusion as to their life work; 26, or 12.8 per cent, registered no choice. Of the 177 boys expressing some preference, the largest number, 57, indicated manufacturing and mechanical industries; 54, professional service; 25, agriculture, forestry, and animal husbandry; and 19 chose commerce. Only 39 of the 203 boys, or 19.3 per cent, wished to follow the occupations of their fathers.

Prevocational Classes in New Home. The prevocational classes in the Delaware school at Syracuse, N. Y., have been transferred to the new Delaware Annex.

Part-Time School for Employed Children. In addition to the regular work carried on in the grammar and high schools at Harriman, Tenn., a part-time school is conducted for children between the ages of 14 and 16 who find it necessary to work. The school is under the direction of the superintendent and the expenses are met by public funds, supplemented by the Harriman Hosiery Mills. The equipment of the school is modern.

Smith-Hughes Classes in Mill Sections. Smith-Hughes classes in home making have been organized in two mill sections at Harriman, Tenn.

The classes meet twice each week in the afternoon and are well attended. The ages of the pupils range from 18 to 60 years and the enrollment is good.

The per cent of illiteracy is being materially reduced in the community and it is the hope of those in charge that the town may become one hundred per cent literate. In addition to the above, a continuation school is conducted at the high school for those who have failed to complete the regular course and who must work during the day. The students are charged a small tuition fee which goes to those in charge of the classes.

Home Economics Courses Introduced. Home economics courses have been introduced in the sixth, seventh and eighth grades at Harriman, Tenn., for the first time this year.

De LaHowe Cornerstone. The cornerstone of the administration building for the John De LaHowe Industrial School was laid on April 14th, at Willington, S. C., with appropriate ceremonies. The school became a state institution in 1918, and it is predicted will have an enrollment of 200 this summer. About 90 per cent of the enrollment is composed of children who have lost either one or both parents.

The state has spent about $200,000 on the school since taking it over, and at present a technical school is in process of erection. It will house the carpentry, iron working, feed grinding, laundry, sewing and printing departments.

Automobile Mechanics. A new course in automobile mechanics has been established in Philadelphia, with an enrollment of fifty boys. Mr. Elias Freed is instructor in the new course.

Cooperative Vocational Course. A well-rounded course of cooperative vocational education has been established at Lock Haven, Pa. Twenty-four employers have cooperated and fifty boys have been placed. Among the activities used for training purposes are automobile mechanics, electrical construction, armature winding, motor and generator work, battery work, house wiring, carpentry, painting and paper hanging, plumbing, printing, machinery operation, baking and butchering. Mr. F. S. Pletcher is director of the work.

(Concluded on Page 26a)

A NEW CARTER SHAPER FOR SCHOOLS

AS A BENCH SHAPER (¼ H.P.)

Shown with motor perpendicular to table, with combination jointer and straight gauge with guard attached, circular guide at the side.

Will do the largest work you will ever want to do and is
ABSOLUTELY SAFE

AS A BENCH SHAPER, the motor being swiveled to the table, cutters can be set up at any angle to table and a great variety of shapes cut with minimum number of cutters. Cutter is perfectly guarded at all times.

AS A JOINTER. Straight gauge being designed like the bed of a jointer with 2″ jointer cutter screwed to shaft small jointing can be done. Much safer than regular jointer.

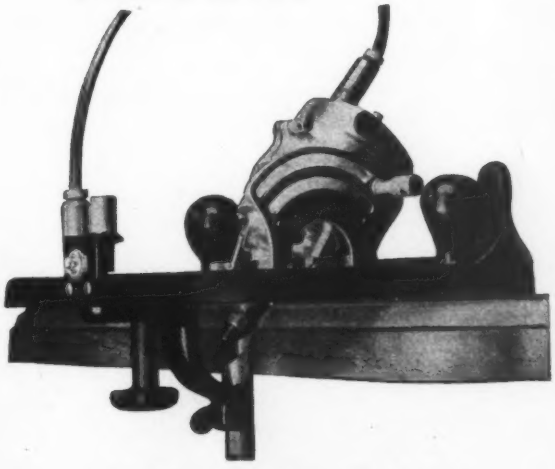
AS A PORTABLE SHAPER. For shaping large table tops, etc., machine is turned upside down, operated by handles on the under side and run over the work.

REMEMBER

our 1/7 H.P. Router for veining, two tone work, all kinds of line work, inlay, paneling and (with beading and fluting attachment) Beading and Fluting of spindles, etc.

PRICES

1/4 H.P. Shaper complete as shown (without cutters)	$121.00
1/7 H.P. Shaper with table and guides (without cutters)	57.00
1/7 H.P. Router complete (without bits)	46.50
Beading and Fluting Attachment (extra)	15.00



AS A PORTABLE SHAPER (¼ H.P.)

Shown being used inverted with motor at 45° angle and using circular guide.

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THE R. L. CARTER CO., INC., 1208 Chestnut Street, Phoenix, New York.

CARTER PRODUCTS

Some people think the point of a drill is the extreme tip of the cutting end!

Actually, that extreme tip is known as the "Dead Center"—while "The Point" is the *entire* cone-shaped surface at the cutting end. All that you see in the illustration above is "The Point."

This is only one of the many interesting and instructive definitions to be found in the Handbook for Drillers. In it every part of a twist drill is clearly and simply described—plus a great deal of useful information on grinding, cutting speeds, feeds and how to secure the best results when drilling in various metals.

Vocational Directors and Instructors are invited to ask for copies of the Handbook, in any reasonable quantities, for the use of their machine shop classes.

The CLEVELAND TWIST DRILL COMPANY CLEVELAND NEW YORK-CHICAGO-LONDON

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Manufacturers of Carbon and Cle-Forge High Speed Drills for every purpose; "Mezzo" Super-Carbon Drills; Hand, Jobbers' and Shell Reamers; "Peerless" High Speed Reamers; "Paradox" Adjustable Reamers; "Quick-Set" Reamers "Spirex" Machine Taper Pin Reamers; Chucking Reamers for Turret Lathes; Counterbores; Countersinks; Sockets; End Mills; and the "Esy-Out" Screw Extractor.

(Concluded from Page 24a)

Paper-hanging Classes. Directors of vocational education interested in organizing classes in paper hanging for apprentices or journeymen are directed to the Federal Board Bulletin No. 102 and the Wallpaper Manufacturers' Association Bulletin No. 102A, giving teaching material and procedure in organizing these classes. Supplies of practice paper, paste, and patching material for use in these classes may also be secured free of charge from Mr. E. K. Jenkins, 461 Eighth Ave., New York, N. Y.

Two-Year Smith-Hughes Course. A two-year Smith-Hughes vocational course in plumbing is being offered at Erie, Pa. Mr. J. H. Rainsford is the instructor.

Girls' Trade School. A girls' trade school has been opened in the Irwin Avenue School at Pittsburgh, Pa. The school opened with an initial enrollment of 92 girls. It is the second of its type to be organized in Pennsylvania, the other being the Girls' Trade School in Philadelphia.

Vocational Building. Director James Killius and Supervisor J. E. Wagner of Johnstown, Pa., are housed in new offices in the senior high school. Practically the entire first floor of the building has been planned for vocational education. This includes drawing rooms, machine shops, plumbing, electrical, printing, wood working, carpentry, joinery, pattern making, and sheet metal shops.

Performance Tests in Shop Work. Shop teachers at Williamsport, Pa., have experimented with performance tests in shop work. All boys were tested in the shop and grades were based on actual work done. The examinations took the form of a rating scale and each student was rated on such points as accuracy, time required, care of tools, shop etiquette, false moves, attitude, safety precautions, care of machine, and conservation of materials.

Industrial Arts Courses. Industrial arts courses have been introduced in the Ashbourne grammar school of Cheltenham Township, Elkins Park, Pa. Shop facilities for general shop activities in woodwork, metal, electricity, printing, cement and concrete work are provided. A separate room has been set apart for mechanical drawing.

Machine Shop Course. A machine shop course with adequate equipment has been added to the industrial arts department of the senior high school at Butler, Pa. General shop courses with multiple activities in cabinet making, pattern making, wood turning, mill machinery, cement construction, foundry work, practical and mechanical drawing are being offered. Mr. M. R. Frederick is instructor in mechanical drawing.

Miss Lois Sue Gordon, a well-known artist and teacher of art, has joined the educational department of the American Type Founders Company at Jersey City, N. J., as art consultant. Miss Gordon was formerly connected with the art department of the Minneapolis Junior High School, and was also supervisor of art at McKeesport, Pa. She was more recently associated with one of the old established art supply firms of the middle west.

Miss Gordon will have in charge the working out of courses and methods of instruction for bringing out art values inherent in printing. She will be at the service of teachers of art and elementary printing who are in need of special assistance in connection with their work.

Mrs. Luella M. Foster, for the past three years state supervisor of home economics education in Nevada, resigned in March. During Mrs. Foster's three years of service, she was successful in stabilizing the teaching of home economics and outlining definite courses of study. A well qualified teaching force has been obtained and the number of departments offering home economics has been increased to approximately double that of three years ago.

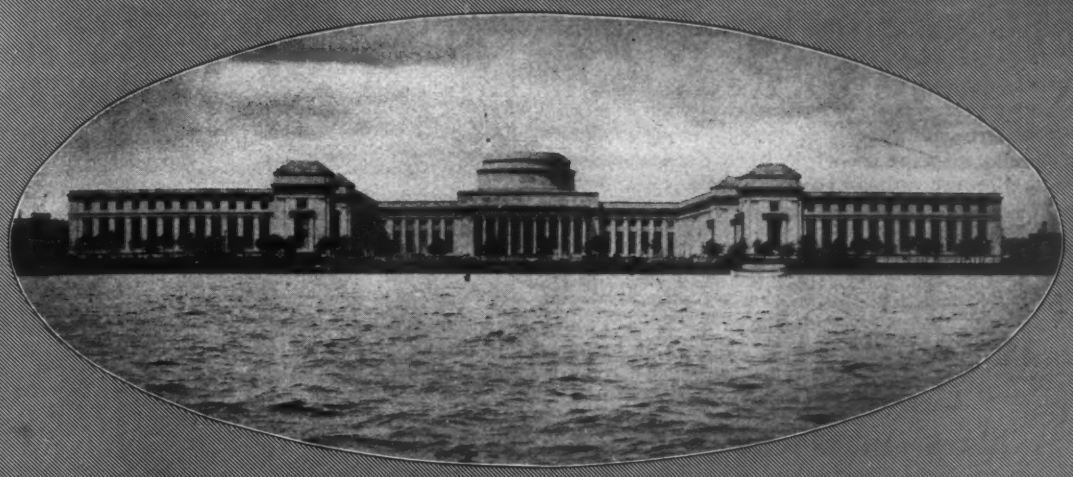
Suggested Outline of Instruction for a Two-Year Course in Printing for Vocational Schools. Prepared under Mr. Eugene D. Fink of the New York State Education Department, with the aid of Mr. Harry P. Bohrer of Rochester, and Mr. Arnold Levitas of New York City. Printed by the Monroe high school printing department of Rochester, and issued by the vocational and extension division of the New York State Education Department.

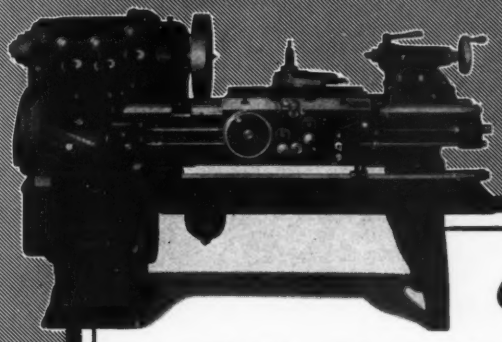
The outline covers the content of work for two years of forty weeks each, the week to consist of fifteen hours of actual shop work and fifteen hours of related shop work. It presents only the subject-matter to be taught and does not suggest sequence or teaching methods.

The course covers nine units of work, embracing straight matter composition, intricate straight matter composition, display composition (commercial job work and advertisements), errors in type matter, distributing type and material, locking up for press, feeding and making ready for presses, and finishing, folding, stitching and paper cutting.

Part-time Classes Increased. Part-time classes will be increased in the schools of Guthrie, Okla., next year with federal and state aid. An additional teacher will be employed at a salary of $2,000 per year.

Issue Mine-Safety Films. The U. S. Bureau of Mines, Pittsburgh, Pa., has issued three new mine-safety motion picture films, of one reel each. The first film is entitled "Twelve Points of Safety" and offers a few important safety measures to be taken in connection with the operation of coal mines. Another film is entitled "First Aid to the Injured" and shows the proper methods of emergency treatment to be used in case of accidents encountered in the work of mining. A third film, depicting the use and care of oxygen breathing apparatus in mines and other places, demonstrates the methods of charging and testing oxygen bottles and shows a series of views illustrating a mine rescue crew exploring a mine.





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MONARCH Helical Geared Ball Bearing LATHE

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The prestige of this Institute—the corner-stone of Massachusetts' enviable system of vocational education — attracts students from the four corners of the civilized world.

In choosing the equipment for these students, the directors of the Institute must base their choice upon equipment that will give students the greatest possible amount of experience.

We are proud of the selection of the MONARCH Engine Lathe as a part of the Institution's metal working equipment — proud that it has been selected solely upon its merit, after careful consideration, as the type of equipment necessary for the high degree of training which Massachusetts "Tech" gives to its students—a training which has been so creditably reflected on the Institution by its graduates.

We shall be glad to plan your vocational metal working shop. Give us a statement of your requirements and let our Free Engineering Advisory Service plan your shop, giving you an accurate estimate of the entire equipment cost. This service is gladly rendered without charge.

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Steel Sheets that Resist Rust!

The destructive enemy of sheet metal is *rust.* It is successfully combated by the use of protective coatings, or by scientific alloying to resist corrosion. Well made steel with an alloy of Copper will last longest. Insist upon

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Black Sheets for all purposes
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Our Sheet and Tin Mill Products represent the highest standards of quality and utility, and are particularly suited to the requirements of the industrial shop, and the particular sheet metal worker. Sold by leading metal merchants and distributors.

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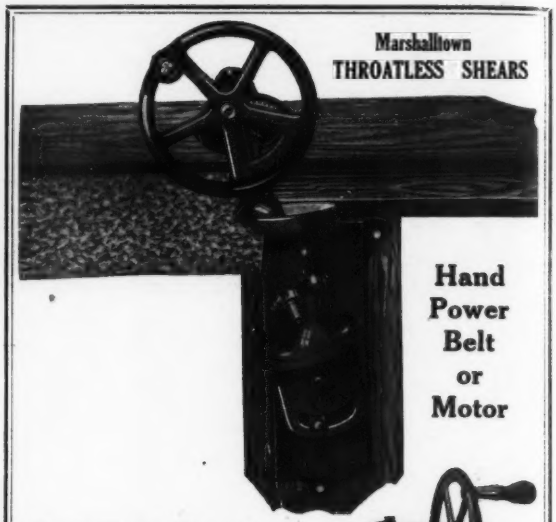
Marshalltown
THROATLESS SHEARS



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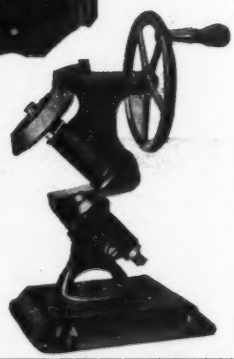

Marshalltown Throatless Shears will take sheets and plates of unlimited width and cut curves of small radius in any direction.
Made in several sizes with capacity up to and including ½-in. boiler plate.
We have a size and style to suit your work.

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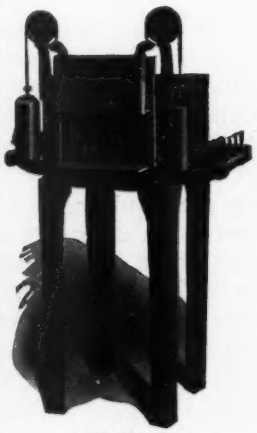

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An Oven Type Furnace with an extremely heavily lined firebox, 14 inches deep, 11 inches wide and 7 inches high.

The heat can be regulated to a very fine degree and maintained by six burners, each with shut off valves.

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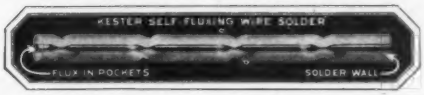
Makes Soldering Easy, Clean and Certain



A good standard of accomplishment is the objective of every teacher. The work is varied, skills are being acquired and the "puddled" solder job owing to the improper use of flux is particularly annoying.

Kester Self-Fluxing Wire Solder supplies its own scientific flux from tiny pockets inside itself as it is used.. "It requires only heat," eliminating the acid pot.

The possibilities in favor of clean and substantial work on the part of the boy or girl doing soldering in the general shop are immediately apparent to the instructor because of the ease and convenience in the use of Kester Solder.

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Ready for Use

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KESTER *Acid Core* **SOLDER**

For general soldering on new or old work in the general shop, sheet metal shop, home mechanics shop, specify Kester Acid Core Wire Solder.

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Gentlemen:

Please send the following number of working samples:

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The number of boys in our shops are:

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Sheet Metal.....Home Mechanics.....

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KESTER *Rosin Core* **SOLDER**

For all electrical soldering and radio work specify Kester Rosin-Core Wire Solder.

A WOMAN OPERATES AN ANVIL FOUNDRY

Here is the story of a plucky American woman who grappled with the exigencies of life, and came out on top. She found herself confronted, as women frequently do, with the necessity of becoming the provider for the home. She possessed both physical and moral courage to enter upon a conflict with the elements of nature. The immediate opportunity was an iron foundry. She became a successful worker, producer, and manager, and earned for herself the title of "the anvil queen".

In this day and age there are women manufacturers—women manufacturers of ladies' and children's clothing, of furniture, and of rugs but the idea of a woman anvil manufacturer is quite different. To take a woman out of a sheltered, homelike atmosphere, and then quite suddenly to thrust her into the noisy, dirty, and rather uncouth atmosphere of a foundry is a happening that does not fall to many women in this workaday world.

Mrs. Harriet Fisher Andrew has played a prominent part in the industrial world for the last 25 years. As president of the Eagle Anvil Works at Trenton, N. J., she is the only woman in the United States engaged in this particular line of business. As a result of her activities in the foundry and her various trips to all parts of the world in her negotiations for contracts, she has enjoyed a wide and varied acquaintance with men and affairs and has seen life in all its complexities, and in all the diversities found in the several civilized countries of the present day. She has tasted of adventure in all its excitement and allurement and has no doubt witnessed much of the grandeur and romance of the places which she has visited.

As a girl, Mrs. Andrew received the polite sort of education considered essential to the proper development of a young lady of that time. She attended a young ladies' seminary in Cleveland, and then spent four years in Germany.

Mrs. Andrew was married in 1899 to Captain Clark Fisher, a retired army engineer, who had inherited the anvil works from his father, who made the first anvil by a special welding process which he invented and patented. Her first connection with the work of the plant was made when her husband fell ill and the plant was left without a responsible head. During the long weeks of illness and convalescence, Mrs. Andrew was doubly active in securing funds for the operation of the plant and directing its activities, and in caring for her husband. After the latter's recovery, Mrs. Andrew decided she wanted to learn the business, and accordingly donned a uniform and went into the foundry to learn the business from the bottom up.

During this time she worked at all the jobs to be found in the foundry, molding vises, making rail joints and operating cranes. She allowed nothing to stand in her way of learning the work and no amount of snubbing or intimidation on the part of the workmen was sufficient to frighten her or to turn her from her purpose. Years after, when her husband was killed in a railroad accident, Mrs. Andrew's knowledge and experience stood her in good stead, for she became in fact the actual boss of the plant and directed its activities from that time.

Shortly after Mrs. Andrew took control of the factory, it became so prosperous that it was necessary to enlarge the plant. She made a number of trips to other countries in the interest of the business and through her negotiations with the Argentine navy, she met and married Lieutenant Alfredo Andrew. Not only has she gained the limelight in the manufacturing field, but she has also gained recognition as a short-story writer and the author of a book. She is regularly consulted about the prices of steel and about everything that concerns the health, happiness and welfare of the workers.

Though she has gained foresight, independence, courage and stamina in the course of her training, Mrs. Andrew has not lost her womanliness nor her interest in the lives of others. Rather has she sought to enlarge her field of vision and helpfulness and to convert her added knowledge into channels of usefulness. She maintains a farm of 135 acres near Trenton, where during slack times in the plant, she employs the men in useful work, about the farm.

Thomas W. Johnson has joined the faculty of the Stout institute at Menomonie, Wisconsin. Mr. Johnson brings with him varied experience in the industrial arts. He taught for some years in the St. Louis public schools, then took charge of manual training work at Beardstown, Illinois.

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NEW BOOKS

Fundamentals of Dress Construction

By Sibylla Manning and Anna M. Donaldson. Cloth, 223 pages. The Macmillan Co., New York, N. Y.

The author in this text points out that dressmaking is taught in more different ways and by more different agencies than almost any other subject in the school curriculum. The subject is offered as a part of the domestic arts program, is included in the vocational program for girls, and is one of the subjects found in the regular evening school.

While the present book is intended primarily for the use of students and teachers in vocational and high schools, it is certain to be equally useful to dressmakers who have in charge the training of workers, and to home-owners who have need of a handy reference book.

The book provides material so organized that each step in dress construction is presented in proper sequence and receives natural emphasis. The book opens with a study of the qualities of a good dressmaker, and then proceeds to discuss the topics of stitches and seams, buttonholes and plackets, model making, waists, coats, and decorative stitches, and closes with a chapter on the arrangement of the workroom and its equipment.

The chapter on model making has been prepared with a view to its use by the student who intends to become an independent worker. It offers training in the following of printed directions, which is valuable to the student entering the clothing industry or the dressmaking shop. In the work-a-day world the girl worker must follow printed directions without the aid of a teacher and must depend upon her own accuracy to interpret an order in such a way as to secure the desired results. This the type of instruction offered is intended to ensure.

At the present time when the subject of vocational training occupies such a large place in educational programs, the book will be found to fill the demand of vocational training for work suited to girls.

The Making of Steel

A story of steel briefly and simply told. Paper, eighteen pages. Issued by the Inland Steel Co., Chicago, Ill.

The pamphlet which has been issued in response to the requests of numerous teachers and pupils, offers a well illustrated, non-technical story on the manufacture of steel. The story traces the manufacture of steel through the different stages of development from the molten metal to the finished product. It is well suited for supplementary use in school shops, or classes taking up the study of commercial products.

Problems and Projects in Industrial Arts

By Kenneth R. LaVoy. Cloth, 142 pages. Price, $1.25. Manual Arts Press, Peoria, Ill.

This book has been prepared to offer suggestions and problems for various lines of shop work typical of our industry and of the work-a-day world. It is planned especially for use in shops having only the average manual training equipments and for the general and socalled "diversified" shop. Among the lines of work suggested are radio, concrete, sheet metal, and advanced woodwork.

The first chapter is devoted to simple bench woodwork, and the remaining chapters are devoted to combination problems involving various materials. A list of books for reference, rules for the shop, and a specimen daily cleanup schedule are included.

Foundry Practice

By R. H. Palmer. Cloth, 432 pages, illustrated. Price, $3.00, net. Published by John Wiley & Sons, Inc., New York City.

This is the third edition of a book which is widely used in vocational schools because of its thoroughness, completeness, and accuracy of practical foundry methods. The present edition has been enlarged by descriptions of new time and labor saving materials and machines introduced to overcome the shortage in common labor.

Unit Courses for Workers on Direct-Current Machines. Issued by the department of Smith-Hughes vocational education, of the Kansas State Teachers' College, Pittsburg, Kans. The outline aims to suggest courses of study covering the fundamental information required by the apprentices and journeymen who install, operate, repair, and maintain service on direct current generators and motors.

The courses are divided into two occupations: Part I, installation, operation and maintenance work; Part II, armature winding and machine repair work. The work is composed of classroom work, home study and class discussion, and demonstrations and tests performed by the class under the direction of the instructor.

Manual Training Course in Concrete. A general outline for classroom and laboratory work including exercises and problems. Published by the Portland Cement Association, Chicago, Ill.

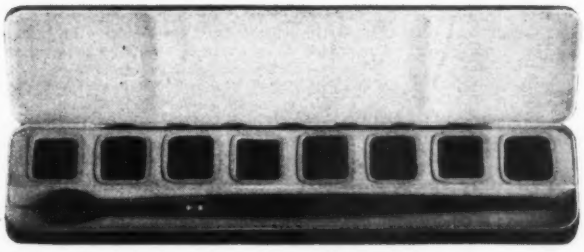
Analysis of the Automechanics Trade with Job Instruction Sheets. By Melvin S. Lewis. Division Bulletin No. 16, Part-time Education Series No. 4, 1925. Issued by the University of California, Berkeley. The present analysis is built upon two earlier studies made by Mr. A. C. Gough, professor of engineering at the Idaho Technical Institute. In addition to the previous material, a new section has been added, consisting of fifty job sheets. The booklet discusses such topics as the types of training for the trade, how the analysis was made, how to use the analysis and a list of the supplemental or related subjects which contribute to trade intelligence.

Everyday Art. Published by the American Crayon Company, Sandusky, O. This issue for the month of April discusses spring flower sketching, poster designing, and the Fifth International Congress.

Where "Prang" Water Colors Are Made

Home of "Prang" Water Colors
SANDUSKY, OHIO,

"Prang" School Water Colors were first brought into use some 60 years ago by Louis Prang. Since then, school authorities in most cities have always specified "Prang or equal."



"Prang" Water Colors are furnished in various assortments of colored cakes or semi-moist pans; four, five, eight or sixteen colors in a box, as desired.

TO most teachers June days mean vacation days from regular routine.

Some employ this time in improving themselves at graduate schools, or schools for special training.

Others use it to pursue that long anticipated "hobby."

Many branch widely afield, and earn additional funds in entirely new work.

And each year, more teachers are answering the call of the Great Lakes region for complete rest and recreation. Many teachers' conventions and institutes are held in this pleasure district during the late spring and the summer months.

All know the Great Lakes region as a pleasure place; but it is also becoming famous for another reason.

At the southernmost point of this beautiful fresh water cluster, stands Sandusky. There are made, and from there are shipped to all parts of the world the famous "Prang" School Paints - those water colors upon which so many teachers have standardized in their art work.

THE AMERICAN CRAYON COMPANY

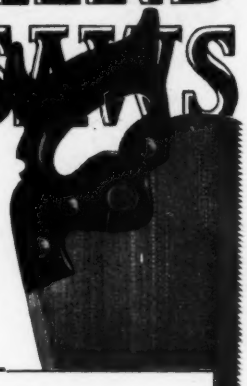
"Old Faithful"

HOME OFFICE AND FACTORIES **36 HAYES AVENUE, SANDUSKY-OHIO**

"Be sure that the name 'Prang' appears on the box - otherwise it is not 'Prang.' "
" 'Prang' Water Colors and 'Prang' Crayons are manufactured and owned only by The American Crayon Company. It alone is the original source of supply "

ATKINS

SILVER STEEL SAWS



The Finest On Earth

The Four Hundred Saw

Silver Steel Saws are made right from the 'Mine to the Market." We first begin with pure ore and to that is added other ingredients (Atkins Exclusive Formula) which makes steel for saws so perfect that it is known among expert saw users by the quality title *"Silver Steel."*

Silver Steel is different from *"just" steel* in that it shapes into the finest saws that the genius of man has developed. The No. 400 illustrated here is one of them.

If you want saws to stand the *gaff* of the most difficult cutting, ask for ATKINS

"The Finest on Earth"

Leading manufacturers of Saws, Saw Tools, Machine Knives, Grinding Wheels, Feed Rolls, and distributors of Cantol Belt Wax.

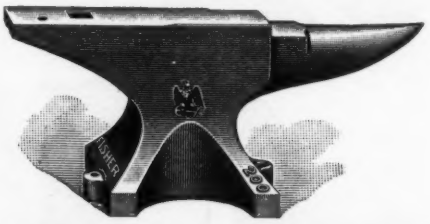
E. C. ATKINS & CO.

Established 1857 The Silver Steel Saw People

INDIANAPOLIS, U. S. A.

THE "EAGLE" ANVIL

The standard anvil for Schools. No deafening ring. Lessons given and heard without interference.



A DECIDED PREFERENCE FOR USE IN MANUAL TRAINING SCHOOLS

— A FEW OF THE MANY USERS —

Tilden High School, Chicago, Ill.
Manual Training High School, Brooklyn, N. Y.
Bushwick High School, Brooklyn, N. Y.
Camden High School, Camden, N. J.
Lawrence High School, Lawrence, Mass.
Mass. Institute of Technology, Boston, Mass.
Mechanics Arts High School, Boston, Mass.
Rensselaer Polytechnic Institute, Troy, N. Y.

Manufactured Since 1843 by the Eagle Anvil Works

FISHER & NORRIS — TRENTON, N. J.

METHODIST BOOK CONCERN Says *"Best Obtainable"*

"For the high grade of work we produce it is absolutely necessary that we use the best devices obtainable for cooking and mixing our glue and we believe that with STA-WARM glue-pots we obtain this result.

"We have used a number of the STA-WARM one-gallon size glue pots in our factory for the last five years and have found them extremely satisfactory. * * * We installed a ten-gallon cooker when our steam-heated glue pot recently broke down.

* * * We have also ordered two STA-WARM glue mixers of 25 gallons each for our new plant, now in course of construction at Dobbs Ferry, New York."

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The Methodist Book Concern
Formerly Rohne Electric Co.

STA-WARM ELECTRIC HEATER CORPORATION
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100% Adhesiveness

A superior adhesive manufactured by the same process as Pure Food Gelatine, under ideal climatic conditions. This process, and the careful selection of raw material, yields a glue of 100% adhesive matter.

The most vital consideration in buying glue is its keeping properties. The BISON BRAND being 100% pure, its keeping properties are guaranteed.

The unusual adhesive strength and penetrating qualities make it an ideal glue for all requirements of the woodworking industry and school shops.

Uniformity is guaranteed.

Liberal working sample submitted upon request, in Sheet, Flake or Ground form.

HENRY WILHELM COMPANY, INC.

134-136 Tenth Street PITTSBURGH, PA.

THE COMMERCIAL EXHIBITS AT THE EASTERN ARTS CONVENTION

The commercial exhibits displayed during the convention of the Eastern Arts Association, April 21st to 24th, at Syracuse, N. Y., were housed on the tenth floor of the Syracuse Hotel. The arrangement afforded the visitors an opportunity to visit each booth and to become acquainted with the materials displayed, since the exhibits were adjacent to the main ballroom where the meetings were held. There were about 35 exhibitors. The following firms were among those having attractive exhibits:

American Crayon Company, Sandusky, Ohio, displayed a complete line of artist's materials, including "Reliefo," "Petroma," and a plastic modeling material, "Omodello."

American Type Founders Company, Jersey City, N. J. Practical demonstrations of work accomplished on hand and lever printing presses with explanation of the development of the subject of printing in schools.

Binney & Smith Company, New York City, displayed their complete line of Gold Medal Products, including "Crayola," "Perma," and "Spectra" crayons, in addition to "Artista" watercolors. The background for the booth consisted of twelve handsome posters done in "Artista Tempera," showing the possibilities of the B. & S. products.

R. L. Carter Company, Phoenix, N. Y. Constant demonstrations of the use of Carter shapers, routers and other hand tools made this booth a popular one. Demonstrations of inlay work and the use of Carter routers proved valuable.

Henry Disston & Sons, Philadelphia, Pa. A full line of Disston saws and tools were displayed, including latest models adapted for school shop use.

Eugene Dietzgen & Sons, Chicago, Ill., showed a complete line of drawing instruments and materials.

Joseph Dixon Crucible Company, Jersey City, N. J., displayed lead pencils and crayons for art work and drawing. This booth also featured a number of well known black and white drawings done with Dixon products.

S. C. Johnson & Company, Racine, Wis. Johnson wood finishers, including stains, filler, enamels, varnishes, etc., were displayed at this booth.

McGraw-Hill Book Company, New York City, N. Y. This exhibit included a number of titles covering art and vocational education.

Milton Bradley Company, Springfield, Mass. Bradley Quality water colors were featured at this exhibit, together with other material used in art and industrial classes.

Niagara Machine & Tool Works, Buffalo, N. Y. This display included a large chart showing in detail the relation of sheet metal work to the various types of schools. Eight reasons were given showing the value of this subject under various conditions.

Stanley Rule and Level Company, New Britain, Conn. A complete line of Stanley tools was exhibited and commanded constant interest.

TRADE PUBLICATIONS

The Making of Blue Prints. The C. F. Pease Co., of Chicago, Ill., has issued a very interesting booklet of sixteen pages, giving instructions for the making of blue prints with the Pease vertical blue printing machine, sheet washer, and sheet dryer. The booklet gives directions for producing negative prints, blue line prints, and brown line prints, and also directions for the use and adjustment of the oil control.

The Pease machine consists of two half cylinders of glass held in place by a frame of metal. It is self-contained and may be attached to the wall or ceiling; it is easily placed at any convenient point, and may be moved from one part of a room to another as desired. It occupies only three square feet of floor space.

The sheet washer is provided with an extra large trough, preventing water from splashing on the floor. The trough may be so arranged that the strainer of the outlet forms a plug, enabling the operator to accumulate a pool of water in the trough, which may be used as a bath tray for small prints.

The sheet dryer is suitable for drying blue prints, negative prints, and all kinds of photographic prints. It occupies a floor space of only 2½ x 5 feet, is manufactured in two different widths, equipped with gas or electric heat as desired.

Information concerning the Pease vertical blue printing machine may be obtained by writing the Pease Company at 813 N. Franklin St., Chicago, Ill.

School Printing Outfits. Barnhart Brothers & Spindler, Chicago, Ill., have issued a booklet on school printing outfits, giving reproductions of typical floor plans, the dimensions of rooms, and the arrangement of equipment. The booklet lists actual equipment for classes of 35 students in high school, college or university classes; for 15 to 30 students in high school and vocational classes, and for groups of eight to twelve students in manual training classes.

The booklet also lists superior school bindery outfits, giving standardized selections for educational instruction in bookbinding and leather art craft. Typical equipment suited to the work is described and illustrated, and tables are given showing outlines of work and the cost of binding books.

Information concerning superior equipment for printing and bookbinding may be obtained by writing to Barnhart Brothers & Spindler, Chicago, Ill.

THE STOUT INSTITUTE

SUMMER SESSION
NINE WEEKS—
June 21, 1926—
August 20, 1926
HOUSEHOLD ARTS
and
INDUSTRIAL ARTS

There will be offered courses in

Vocational and Part-Time Group
Industrial and Trade Education Group
Home Economics Group
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THE STOUT INSTITUTE was the first school in America to specialize exclusively in the preparation of teachers in Household and Industrial Arts, and in Part-Time and Vocational Education.

THE STOUT INSTITUTE has been designated by the State Board of Vocational Education, and has been approved by the Federal Board for Vocational Education, as the teacher training institution for Part-Time and Vocational Education for Wisconsin.

Excellent Summer Recreation Activities.
Low Living Costs.

For Summer Session Announcement and detailed information address

Director, Summer Session,
THE STOUT INSTITUTE
MENOMONIE, WISCONSIN

BRADLEY

SUMMER SESSION

FIRST TERM — JUNE 14-JULY 23
SECOND TERM — JULY 26-AUG. 27

The Summer Session is planned to meet the needs of Supervisors, Teachers and Students of Manual Arts, Vocational Education, Home Economics, Athletic Coaching and General Education.

The following departments will offer elementary and advanced courses:

Art
Automobile
Biology
Business
Chemistry
Drafting
Economics
Education
Electricity
English
History
Home Economics
Jewelry
Mathematics
Metalworking
Physical Education
Speech
Sociology
Woodworking

Bradley Institute is an approved standard college and its degrees are recognized both for teachers' certificates, and for graduate study. Summer Session credits may be applied toward the A. B. or B. S. degrees.

Catalog and detailed information sent upon request.

Director, Summer Session
BRADLEY POLYTECHNIC INSTITUTE
PEORIA, ILLINOIS

The Drawing Teacher. A little eight-page folder, offering teaching projects for the art teacher. Published monthly, by Binney & Smith Co., New York, N. Y. The April issue contained an announcement on the Eastern Arts Convention, and an outline of an art course for the sixth grade.

TRADE PRODUCTS

A Larger Wallace Saw. The J. D. Wallace Co., has just announced a portable saw which is considerably larger and has considerably more capacity than any of the previous well known and widely used Wallace bench saws. The new machine is in reality

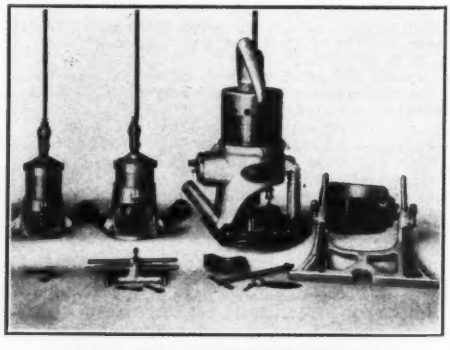
THE WALLACE No. 8 UNIVERSAL CIRCULAR SAW.

a floor type Universal circular saw that combines the wide utility of the self-contained floor type of saw with the mobility of the other types of Wallace bench saws. Complete circulars have been prepared describing the new saw, which is designated by the firm in its trade literature as No. 8 Saw.

Recommend New Improved Type Wood Shaper. The R. L. Carter Co., of Phoenix, N. Y., has issued a descriptive circular explaining the construction and uses of its ¼ h. p. shaper. This shaper is an improvement over the former 1/7 h. p. type previously marketed, in that it is adapted to all the needs of a school and commercial shop.

The machine is particularly recommended for school shops, because it fulfills the requirements of a bench shaper and has in addition a two-inch jointer, as well as a portable shaper. Although the cost of the machine is somewhat higher than that of the original product, it has the advantage of more varied uses, quicker work, and a more excellent type of work.

The ¼ h. p. shaper has a table 15 inches long and 10½ inches wide. An adjustable jointer and straight gauge, 15 inches long, has been designed like a jointer table, the right side of the gauge being quickly set by lever to fine adjustment for depth of cut.



GROUP OF CARTER ROUTERS AND WOOD SHAPERS.

The motor is quickly inserted in a motor holder, which is attached to the sub-base by a swivel so that adjustment may be made, placing the shaper shaft at any angle to table from 45 degrees tilt toward the operator, to 45 degrees tilt away from the operator.

(Concluded on Page 36a)

A Summer School by the Sea

OCEAN CITY STATE SUMMER SCHOOL
OCEAN CITY, NEW JERSEY

For those who are or wish to become

PRINTING TEACHERS

Courses:

METHODS OF TEACHING PRINTING
For Printers and Printing Teachers

THE THEORY AND PRACTICE OF PRINTING
For any Academic or Industrial Arts Teacher or Supervisor who desires to secure a knowledge of Printing Processes

LINOLEUM-BLOCK PRINTING
For All Teachers

ART, AS APPLIED TO PRINTING AND LINOLEUM-BLOCK PRINTING
For All Teachers

OCEAN CITY STATE SUMMER SCHOOL is conducted by the NEW JERSEY STATE BOARD OF EDUCATION. Five weeks, six days a week. Courses open June 28, close July 31, 1926.

Ocean City, New Jersey, where the State Summer School is located *(only twelve miles from Atlantic City)*, is one of the most delightful summer resorts along the Atlantic Coast. Hotel and boarding house rates are very reasonable. Tuition rates for teachers outside the State of New Jersey are nominal—no charge is made to New Jersey teachers.

For further information address

W. A. ACKERMAN
Chief of the Bureau of Credentials, State Dept. of Education
TRENTON, N. J.

JAMES M. STEVENS
Principal Ocean City State Summer School
HIGH SCHOOL, OCEAN CITY, N. J.

F. K. PHILLIPS
Director of Printing Department, Ocean City State Summer School
300 COMMUNIPAW AVENUE, JERSEY CITY, N. J.

– a "K & E" Quality Combination for *real* Economy

DUPLEX: This is an ideal drawing paper for school use, as it stands a maximum of erasures. A sharp ink line may be drawn after erasing time and again over the same spot! Less sheets are wasted, less discouragement for the student. Saves instructor's time and the school money.

Furnished in any sheet-size or in rolls.

"MINUSA" DRAWING INSTRUMENTS

American quantity production enables us to sell these high-grade instruments at a moderate price. *All parts are interchangeable and replaceable*—hence "Minusa" last almost indefinitely.

We also carry a large variety of lower-priced imported Drawing Instruments.

Serial No. on instruments facilitates identification

"POPULAR" DRAWING TABLE

A low priced, serviceable table, especially designed for the Mechanical Drafting class. Has tilting top and can be raised to 42 in. height.

Sizes from 23 x 31 in. to 36 x 60 in.

Shipped K.D. Prices include crating.

Have you a copy of our "Manual Training Catalogue"?

— LET US QUOTE ON YOUR REQUIREMENTS —

KEUFFEL & ESSER CO.

NEW YORK, 127 Fulton Street, General Office and Factories, HOBOKEN, N. J.

CHICAGO 203-209 S. Dearborn St. ST. LOUIS 817 Locust St. SAN FRANCISCO 30-34 Second St. MONTREAL 5 Notre Dame St. W.

Drawing Materials, Mathematical and Surveying Instruments, Measuring Tapes

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WEBER

Drawing Instruments & Materials

(Concluded from Page 34a)

The sub-base is fastened to the end side of the shaper table by screws, and is slit so that the shaper shaft may be adjusted to any point from two inches beyond the center of the table, to two inches in front of the center.

The machine is capable of a variety of uses because of its unusual adjustability. As a bench shaper, all kinds of small and medium-size work can be done quickly and well and without danger to inexperienced users. As a portable shaper, much work can be done on pieces after assembly, as well as on pieces too large to be handled. It is very handy for mortising up to ¾ inch deep and ½ inch wide, and to any length. The machine sells complete for $68.

Information concerning the Carter shaper may be obtained by writing to the R. L. Carter Co., at Phoenix, N. Y.

Catalog of Wallace Portable Machines. The J. D. Wallace Co., of Chicago, Ill., has issued an interesting catalog describing and illustrating the Wallace portable machines. The pamphlet lists the Wallace portable band saw, the universal saw, the universal circular saw, the portable plain circular saw, the portable jointer and planer, the portable lathe, and the wonder grinder and sander, also electric glue pots, special moulding heads for jointers and saws and cutter heads for use on Wallace circular saws. Each machine is accompanied by distinct specifications and a list of the parts of the machine.

Information concerning the Wallace machinery may be obtained by writing to the Wallace Company at Chicago.

American Crayon Company Purchases Plant. The American Crayon Co., of Sandusky, O., has purchased the plant of the Standard Ink Company at Minneapolis. The entire plant will be moved to Sandusky, where it will be given over to the manufacture of "Permex," a writing fluid in paste form.

Simonds Annual Prize Contest. Mr. Alvan T. Simonds, of the Simonds Saw and Steel Company, Fitchburg, Mass., has announced his annual prize contest for advancing the study of economics in the United States.

Three awards, amounting to $1,500 will be made. The contest is this year open to everybody and to all parts of the country. The subject for the competition is "Saving and Spending as Factors in Prosperity." The judges in the contest will be selected from experts in economics, business and related activities.

Communications regarding the prize contest may be addressed to the Contest Editor, Simonds Saw and Steel Co., 470 Main St., Fitchburg, Mass.

HIGGINS'

Drawing Board Paste

DESIGNED particularly for the architect, engineer, draughtsman or student who needs a paste which will make mounted paper *stay flat* on the drawing board. Drawings, pictures and maps mounted on cloth or board with HIGGINS' Drawing Board Paste positively will not warp, wrinkle or discolor. HIGGINS' Drawing Board Paste is especially effective in keeping the drawing paper smooth when colored ink washes or water colors are applied.

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271 Ninth St., Brooklyn, N. Y.
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Pencil Department
JOSEPH DIXON CRUCIBLE COMPANY
Jersey City, N. J.

POST

DEPENDABLE DRAWING INK

THE STANDARD BY WHICH OTHERS ARE JUDGED

IN THIRTEEN COLORS

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for courses in

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Perspective Sketching
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SMOKING STAND TRIMMINGS
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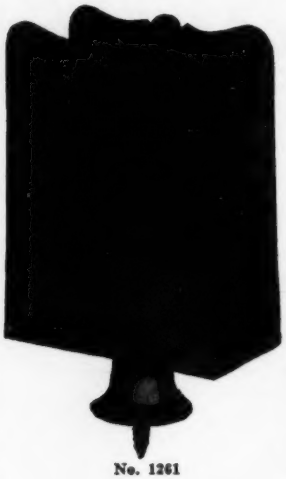

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No. 1258

Reduced Cut
Nos. 1251 and 1257
Complete with
Glass Bowl

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No. 1261½.	Match Box Holder, Dull Copper.	
No. 1258.	Cigar Rest, Dull Brass.	
No. 1258½.	Cigar Rest, Dull Copper.	
No. 1251.	Tray, 4⅜	in. outside diam., Dull Brass.
No. 1251½.	Tray, 4⅜	in. outside diam., Dull Copper.
No. 1257.	Tray, 6	in. outside diam., Dull Brass.
No. 1257½.	Tray, 6	in. outside diam., Dull Copper.

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- Sheet Metal Machinery
- Sheet Metal Supplies
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- Squares
- Stains
- Stencils
- Stones—Precious
- Taps
- Thumb Nuts
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- Tools
- Tool Cases
- Tool Grinders
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- Trowels
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No. 100
Foot Power. Clamps to the Bench and Is Adjustable to Any Height.

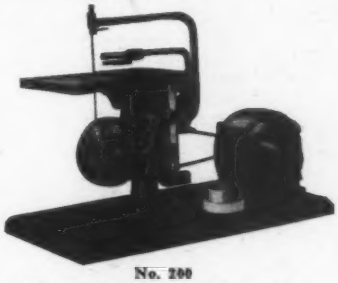
Trojan Scroll Saws are built for precision and production work.

Capacity—From the finest inlay work up to two inches in thickness.

Sturdily built with hardened and tempered tool steel frame.

Accommodates 6½ inch coping saw blades.

Jewelers' or scroll saw blades may be used with our extra clamp attachment.



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No. 3 Medium	15 Tooth,	1/16 Wide
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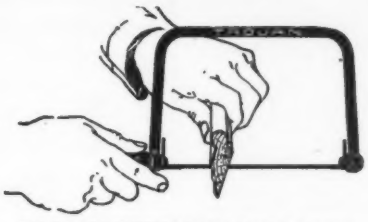
No. 4 Loop End		6 in. Long



TROJAN JUNIOR SAW BLADES
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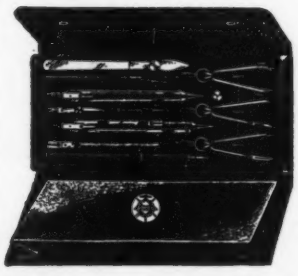

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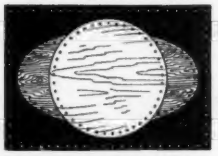
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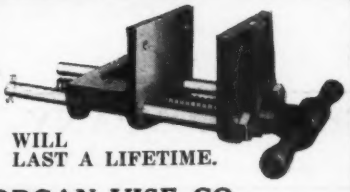

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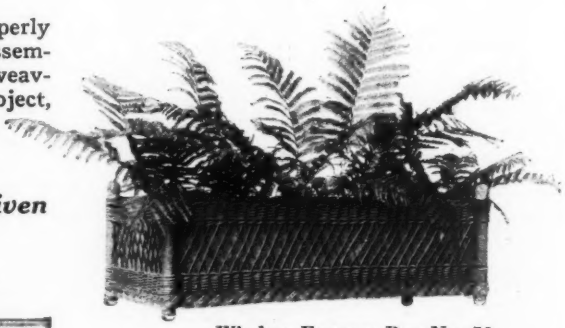
Footstool No. 100

Width 11". Height 11". Length 17".
A very useful article that is welcome in every home. This Footstool is an ideal beginner's project because it is low in price and its construction necessitates nearly all weaves used in making woven furniture. Many instructors consider it one of the most practical and valuable projects in our assortment.
Frame (K.D.) and complete weaving and finishing materials for a Walnut, Mahogany or Oak Finish, only $2.40.



Window Fernery Box No. 53

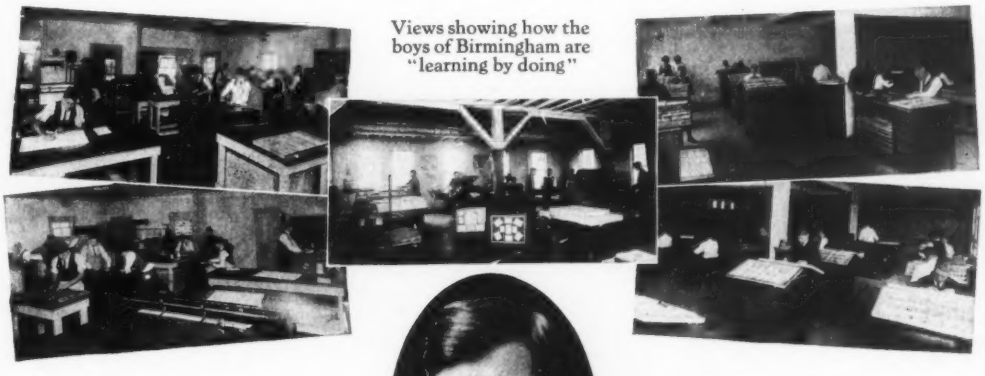
Made with 10" x 28" base with corner posts. Length 28". Width 10".
Frame (K.D.), galvanized fernery box and all weaving and finishing materials.....$3.00

Chair No. 941

Seat 20" wide. Height of back 21".
This beautiful chair illustrates the possibilities of Art-Fibre Furniture Weaving. It is almost as easy to weave as Footstool No. 100.
Frame (K.D.), seat springs, Nachman spring-filled cretonne cushion and all weaving and finishing materials, only $13.95.

SOUTHERN SCHOOLS "TEACH WITH TYPE"

Views showing how the boys of Birmingham are "learning by doing"



Among the
Progressive Schools of the South
to install Printing Outfits
during 1923 are the
EAST LAKE INDUSTRIAL SCHOOL
WOODLAWN HIGH SCHOOL
PHILLIPS HIGH SCHOOL
Birmingham, Alabama

DIRECTOR R. F. JARVIS
of the
Department of Vocational Education
BIRMINGHAM
tells of the uses of the equipments
and the value of Printing as a
practical educator
as follows:

"The Board of Education, Birmingham, Ala., purchased print shop equipment for the Woodlawn High School from Barnhart Brothers & Spindler, to be installed at the opening of school in 1923.

"The success of the printing work in the Woodlawn High encouraged the Board of Education to authorize the organization of printing courses in the new Phillips High School, which was completed during the summer of 1923. The outfit which had been purchased for Woodlawn High had proven so satisfactory that a second complete order was given to the same firm.

"The equipment in each shop is very similar. The Phillips outfit is somewhat more complete and includes some bookbinding equipment in addition to printing. Our printing classes are organized and equipped for fifteen students, with the possibility of using as many as twelve at typesetting at one time.

"Our two-year vocational course in printing is organized in accordance with State and Federal requirements. Three full hours are given to practical and productive work in the shop under the direction of a printer with practical shop experience. The remaining three hours of the day are given over to related work, consisting of free-hand drawing and design, English, citizenship and mathematics.

"While being trained in the technical operations of the trade, the students are engaged in producing the printing wanted by the school.

"We do not over-emphasize production at the expense of instruction. In a city the size of Birmingham there is a vast amount of printing required for the school system, and where printing is a regular school study much more is obtainable than would be possible if printing were not taught.

"Each of our high schools has its own school paper, and several of our elementary schools publish a paper from time to time. In addition to the experience the students get in newspaper work, they receive instruction in commercial work of various forms used in the schools. The work when completed is always of commercial standard.

"The work of printing is new in Birmingham, but its success is assured. It is one of the most valuable courses that we have to offer."

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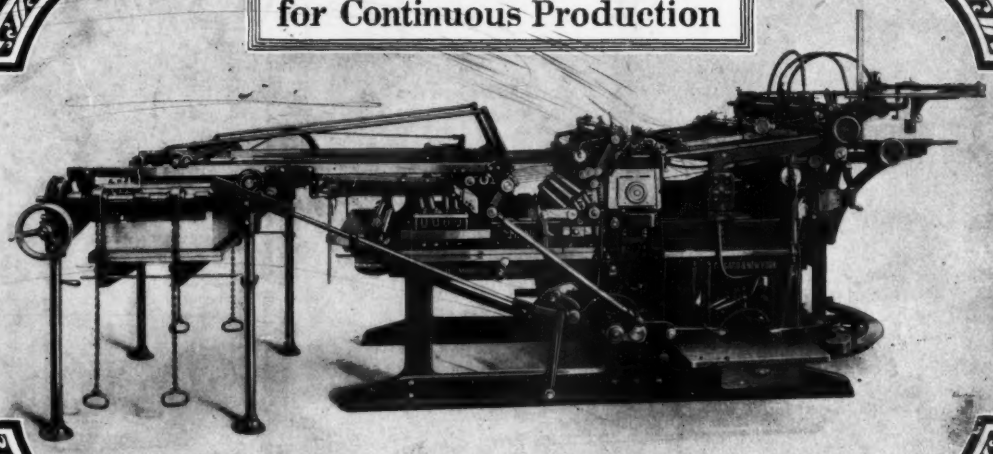

ECONOMY

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